

**A Longitudinal Examination of Indirect Effects involving Parenting,  
Temperament, and Antisocial Behavior in Adolescence**

by

Amanda Stoner

A thesis  
submitted in partial fulfillment  
of the requirements for the degree  
Doctor of Philosophy

Department of Psychology  
BROCK UNIVERSITY  
St. Catharines, Ontario

October 2017

© Amanda Stoner, 2017

## **ABSTRACT**

The current dissertation examined whether authoritative parenting was indirectly related to adolescent antisocial behavior over time through adolescent temperament, and whether adolescent temperament was indirectly related to authoritative parenting over time through antisocial behavior. My original contribution to knowledge through this dissertation was to demonstrate the longitudinal, direct and indirect relations between a broad view of parenting, several aspects of temperament, and antisocial behavior during early adolescence. A community sample of 10- to 15-year-old male and female adolescents and their mothers responded to questionnaires at two times spanning 18 months. The dissertation is comprised of three studies, each focusing on a different aspect of temperament: effortful control in Study 1, affiliation in Study 2, and frustration in Study 3. In each study, two different models were tested. In the first model, path analyses were used to simultaneously estimate the direct and indirect effects between each of the Time 1 parenting dimensions (psychological autonomy granting, acceptance-involvement, knowledge, tracking, and limit setting) and Time 2 antisocial behavior through Time 2 adolescent temperament. In the second model, path analyses were used to simultaneously estimate the direct and indirect effects of Time 1 temperament on Time 2 parenting through Time 2 antisocial behavior. The analyses in the current studies used a statistically conservative approach in that the initial levels of both the mediators and outcome variables were controlled for in the path models. Results showed that even with high stability of temperament and antisocial behavior, parenting still related to changes over time in antisocial behavior directly and indirectly through adolescent temperament. Also, even with high stability of antisocial behavior and parenting, temperament still related to changes over time in parenting directly and indirectly through antisocial

behavior. Overall, the current dissertation builds on the case for a temperament-based foundation of antisocial behavior, and shows that the link between parenting and antisocial behavior is sometimes indirect through adolescent temperament which itself uniquely accounts for changes in parenting, directly and indirectly through antisocial behavior. Applied implications and suggestions for future research are discussed.

**Keywords:** *adolescence, antisocial behavior, parenting, temperament, longitudinal*

## **ACKNOWLEDGEMENTS**

Drew Dane has been the most remarkable supervisor for me in the completion of this project. He has provided me with practical support and guidance in the form of brainstorming with me, offering me meaningful feedback and suggestions regarding how to best organize and convey my thoughts, and most importantly, by giving me encouragement and motivation along the way. His humor and friendly nature have helped to put me at ease when I really needed it, and I have greatly appreciated the kindness and understanding he has shown me since the very beginning. Thank you, Drew!

Teena Willoughby and Angela Book, you have been amazing committee members! I appreciate your patience and flexibility in working with me, the helpful and insightful recommendations you give, and the expertise and leadership you both possess when it comes to conducting your own research and supervising your own students. I think of you both with great respect because of your cheerful, down-to-earth personalities, and because of the investments you have made to excel in your individual lines of work.

Michael, my dear and wonderful husband, you are a one-of-a-kind man. You graciously committed yourself to support me and help me, while I completed my graduate studies. I admire you and I am thankful for your willingness to place the needs of your family before your own. Thank you for the sacrifices you made in your career by taking not just one, but two, parental leaves, and for working from home as much as possible, so that our children could stay home with a father who loves them and wants what's best for them. Time passes too quickly it seems, but it has meant so much to each of us to have you as a constant presence in our home while we have gone through many changes and challenges together. I love you and thank you for loving me.

Mom, you have made sacrifices of your own, in supporting me and standing behind me, and I want these words to communicate my heartfelt gratitude to you. Ever since I first expressed interest in pursuing a degree in Psychology, you and Dad encouraged me and helped me so that I could succeed. Since the birth of your first grandchild, you tag-teamed with your son-in-love to provide excellent daycare to our kids, and I know they have loved having Grandma around so much. You made many trips by GO train from Pickering to Burlington despite your uneasiness about public transit, you prayed for me with humility and faithfulness on many occasions, and you served me by washing my feet, giving me massages, and helping around the house with cooking and cleaning dishes. You have uplifted me with beautiful words in homemade cards that I can cherish and re-read whenever I wonder, *what on earth am I doing* and *am I ever going to make it?* You are a rock-solid example of the faith and contentment that a loving mother can inspire in her children.

Finally, I am grateful to my heavenly Father, because apart from him, this whole journey would have been impossible for me to traverse. It is because of his grace and tenderness toward me, that my heart has felt joy, peace, and a hope that overflows during seasons when I was tempted to feel utterly exhausted and overwhelmed, as I considered the enormity of the task and my limited resources to accomplish it. God gave me the abilities, the strength, and the perseverance I needed to finish this particular work, but more than that, he gave me the gift of his Son that I might be forgiven, justified, and reconciled to him, to live for his glory. Thank you, Jesus, for being my light and my life and for accomplishing in me the impossible, and that you promise to do the same for all who trust in you.

## TABLE OF CONTENTS

ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iv
TABLE OF CONTENTS.....	vi
LIST OF TABLES.....	xi
LIST OF FIGURES.....	xiii
LIST OF APPENDICES.....	xiv
CHAPTER 1: GENERAL INTRODUCTION.....	1
Overview.....	1
The Development of Antisocial Behavior.....	6
Purpose of the Present Dissertation.....	11
Structure of the Present Dissertation.....	14
Pertinent Research in the Antisocial Behavior Literature.....	16
Integrating Parenting and Temperament with Antisocial Behavior.....	23
Gaps in Previous Research and the Proposed Dissertation.....	27
References.....	30
CHAPTER 2: STUDY 1 .....	39
Authoritative Parenting and Effortful Control.....	40
Effortful Control and Antisocial Behavior.....	45
Indirect Link between Parenting and Antisocial Behavior through Effortful Control .....	46
Antisocial Behavior and Effortful Control Predict Parenting.....	48
Contributions of the Current Study.....	50
Research Questions and Hypotheses of the Present Study.....	52

Method.....	53
Participants.....	53
Procedure.....	54
Missing Data.....	54
Measures.....	56
Plan of Analyses.....	63
Results.....	64
Preliminary Analyses.....	64
Main Analyses.....	72
Alternate Analyses.....	80
Discussion.....	87
Indirect Effects of Parenting on Antisocial Behavior through Effortful Control.....	89
Indirect Effects of Effortful Control on Parenting through Antisocial Behavior.....	97
Direct Longitudinal Parenting Effects on Antisocial Behavior.....	98
Direct Longitudinal Effortful Control Effects on Parenting.....	102
Limitations.....	104
Strengths and Contributions.....	106
Suggestions for Future Research.....	107
Conclusions.....	108
References.....	111
CHAPTER 3: STUDY 2.....	121
Defining Affiliation as a Temperament Construct.....	121

Affiliation and Antisocial Behavior.....	123
Indirect Effects of Parenting on Antisocial Behavior through Affiliation.....	128
Indirect Effects of Affiliation on Parenting through Antisocial Behavior.....	131
The Present Study.....	132
Contributions of the Current Study.....	133
Method.....	134
Participants.....	134
Procedure.....	134
Missing Data.....	135
Measures.....	136
Plan of Analyses.....	142
Results.....	143
Preliminary Analyses.....	143
Main Analyses.....	148
Alternate Analyses.....	155
Discussion.....	162
Indirect Effects of Parenting on Antisocial Behavior through Affiliation.....	162
Indirect Effects of Affiliation on Parenting through Antisocial Behavior.....	167
Implications for Parents.....	170
Strengths and Limitations.....	171
Suggestions for Future Research.....	173
Conclusions.....	174
References.....	177



CHAPTER 4: STUDY 3.....	184
Frustration and Antisocial Behavior.....	185
Authoritative Parenting and Antisocial Behavior.....	189
Parenting and Frustration.....	190
Bidirectionality.....	193
The Current Study.....	195
Method.....	196
Participants.....	196
Procedure.....	197
Missing Data.....	198
Measures.....	198
Plan of Analyses.....	204
Results.....	205
Preliminary Analyses.....	205
Main Analyses.....	211
Alternate Analyses.....	217
Discussion.....	224
Indirect Effects of Parenting on Antisocial Behavior through Frustration.....	224
Indirect Effects of Frustration on Parenting through Antisocial Behavior.....	229
Direct Effects of Parenting on Antisocial Behavior.....	231
Lack of Significant Direct Effects of Frustration on Parenting.....	233
Practical Implications.....	234
Theoretical Implications.....	237

Strengths and Limitations.....	237
Suggestions for Future Research.....	239
Conclusions.....	240
References.....	242
CHAPTER 5: GENERAL DISCUSSION.....	249
Indirect Effects of Parenting on Antisocial Behavior through Temperament..	253
Indirect Effects of Temperament on Parenting through Antisocial Behavior..	267
Temperament and Antisocial Behavior.....	272
Implications.....	275
Strengths and Contributions.....	285
Directions for Future Research.....	288
Final Thoughts and Conclusion.....	291
References.....	293
APPENDICES.....	302

## LIST OF TABLES

Table 1.1	Summary of Research Questions, Measures, and Informants for Each Study
Table 2.1	Means and Standard Deviations of Study Variables and Inter-rater Correlations
Table 2.2	Correlations among Key Study Variables across the Two Waves of the Study – Adolescent Report
Table 2.3	Correlations among Key Study Variables across the Two Waves of the Study – Mother Report
Table 2.4	Proportion of Boys (n = 233) and Proportion of Girls (n = 288) who Endorsed Each Item on the SRDQ
Table 2.5	Summary Table of Standardized Beta Coefficients, Standard Errors, and Probability Levels for Hypothesized Models based on Mother and Adolescent Reports of Parenting
Table 2.6	Summary Table of Standardized Beta Coefficients, Standard Errors, and Probability Levels for Alternate Models based on Mother and Adolescent Reports of Parenting
Table 3.1	Means and Standard Deviations of Study Variables and Inter-rater Correlations
Table 3.2	Correlations among Key Study Variables across the Two Waves of the Study – Adolescent-Reported Parenting
Table 3.3	Correlations among Key Study Variables across the Two Waves of the Study – Mother-Reported Parenting
Table 3.4	Summary Table of Standardized Beta Coefficients, Standard Errors, and Probability Levels of Direct Effects for Hypothesized Models based on Mother and Adolescent Reports of Parenting
Table 3.5	Summary Table of Standardized Beta Coefficients, Standard Errors, and Probability Levels of Direct Effects for Alternate Models based on Mother and Adolescent Reports of Parenting
Table 4.1	Means and Standard Deviations of Study Variables and Inter-rater Correlations
Table 4.2	Correlations among Key Study Variables Across the Two Waves of the Study – Adolescent-Reported Parenting

Table 4.3	Correlations among Key Study Variables across the Two Waves of the Study – Mother-Reported Parenting
Table 4.4	Summary Table of Standardized Beta Coefficients, Standard Errors, and Probability Levels of Direct Effects for Hypothesized Models based on Mother and Adolescent Reports of Parenting
Table 4.5	Summary Table of Standardized Beta Coefficients, Standard Errors, and Probability Levels of Direct Effects for Alternate Models based on Mother and Adolescent Reports of Parenting
Table 5.1	Summary of Direct and Indirect Effects in Each Study: Main Model
Table 5.2	Summary of Direct and Indirect Effects in Each Study: Alternate Model
Table 5.3	Factor Loadings Based on a Principal Components Analysis with Oblimin Rotation for 19 Items of the Self-Reported Delinquency Questionnaire (SRDQ) (N = 521)

## **LIST OF FIGURES**

Figure 1.1	Reference guide describing terms that are related to the construct of self-regulation
Figure 2.1	Diagram of significant paths and squared correlations for hypothesized model based on adolescent-reported parenting
Figure 2.2	Diagram of significant paths and squared correlations for hypothesized model based on mother-reported parenting
Figure 2.3.	Diagram of significant paths and squared correlations for alternate model based on adolescent-reported parenting
Figure 2.4	Diagram of significant paths and squared correlations for alternate model based on mother-reported parenting
Figure 3.1	Diagram of significant paths and squared correlations for hypothesized model based on adolescent-reported parenting
Figure 3.2	Diagram of significant paths and squared correlations for hypothesized model based on mother-reported parenting
Figure 3.3	Diagram of significant paths and squared correlations for alternate model based on adolescent-reported parenting
Figure 3.4.	Diagram of significant paths and squared correlations for alternate model based on mother-reported parenting
Figure 4.1	Diagram of significant paths and squared correlations for hypothesized model based on adolescent-reported parenting
Figure 4.2	Diagram of significant paths and squared correlations for hypothesized model based on mother-reported parenting
Figure 4.3	Diagram of significant paths and squared correlations for alternate model based on adolescent-reported parenting
Figure 4.4	Diagram of significant paths and squared correlations for alternate model based on mother-reported parenting

## **LIST OF APPENDICES**

- Appendix A Factor analyses of antisocial behavior
- Appendix B Fearfulness and antisocial behavior
- Appendix C Affiliation items
- Appendix D Demographic Information
- Appendix E Authoritative Parenting Measure
- Appendix F Early Adolescent Temperament Questionnaire-Revised
- Appendix G Early Adolescent Temperament Questionnaire-Revised Parent Report
- Appendix H Self-Reported Delinquency Questionnaire
- Appendix I Ethics Approval

## CHAPTER 1

### General Introduction

#### Overview

Antisocial behavior has been a widely-studied topic yet it continues to engender a wide range of questions concerning its origin and impact on society. For example, which actions constitute antisocial behavior? Why does it occur or which individuals are likely to engage in it? Does its prevalence deserve public alarm, and what can be done to help the individuals whom it affects? Many researchers have set out to find answers to these and other similar questions, which is why we have such a strong body of working knowledge regarding this topic.

**What is antisocial behavior?** The term antisocial behavior is a broad construct that refers to any action that violates the rights of others while sharply deviating from major societal norms (VandenBos & APA, 2006). Inflicting harm on others and causing property loss or damage are typical displays of antisocial behavior that may be perpetrated during adolescence (Loeber, 1985). Even though behaviors such as truancy, lying, and substance use are sometimes included in the definition, Burt (2012) suggested that these behaviors are more accurately viewed as rule-breaking behaviors in general instead of antisocial behaviors per se. Indeed, the prevalence of past-year alcohol use in fifteen- to nineteen-year-olds in Canada suggest it to be more normative than deviant during the teen years (Statistics Canada, 2015) and smoking cigarettes is not necessarily a direct violation of others' rights so much as it is a matter of detriment to one's own health. However, purchasing these substances as a young adolescent is illegal, and in that sense their use constitutes delinquent behavior.

**How is it operationalized?** There are two main approaches used to measure antisocial behavior; the first measures antisocial behavior “distinct from the legal response to it” (e.g., self-reports and reports by others who are close to the adolescent) and the second measures antisocial behavior of “the most serious offenders, using official records” (e.g., arrest or court records) (Tolan & Loeber, 1993, p.310). Additionally, there are three characteristics by which adolescents’ current involvement in antisocial behavior can be measured, those being frequency, seriousness, and variety (Tolan & Loeber, 1993). The present dissertation uses a self-report measure that assesses the frequency with which adolescents engaged in antisocial behavior in the past year.

With respect to how antisocial behavior is conceptualized in the relevant research literature, antisocial behavior includes the “separable though correlated behavioral dimensions” of aggressive and non-aggressive rule-breaking (Burt, 2012, p.264). Similarly, Emler and Reicher (1995) operationalized antisocial behavior in terms of violence, vandalism, and theft, a definition which aligns with an overt-covert dimension (Loeber, 1982; Loeber & Schmalings, 1985). The modifying term “overt” distinguishes antisocial behaviors that are confrontational and aggressive in nature, or those which encapsulate the violent manifestation of antisocial behavior, from those antisocial behaviors that are “covert” in nature (Loeber, 1982, p.1439). Vandalism and theft are antisocial acts which are “covert” in the sense that they are concealed or non-aggressive albeit deviant (Loeber, 1982, p.1439). Despite factor analytic research that supports distinguishing antisocial behavior along such lines, Burt (2012) acknowledged that antisocial behavior is often conceptualized as a unitary construct instead. She surmised that by collapsing across aggressive and non-aggressive behaviors, important findings



relating to etiological or developmental differences are potentially obscured or distorted in the relevant literature (Burt, 2012). In the current dissertation, the general manifestation of antisocial behavior in adolescence as opposed to a differentiated view of antisocial behavior is examined. (See Appendix A for results from factor analyses and an explanation of why this approach was used.)

**Who engages in antisocial behavior?** Multiple levels of influence are associated with the occurrence of antisocial behavior (Javdani, Sadeh, & Verona, 2011). For instance, the self-control theory of crime posits that individual-level deficits in self-regulation are a primary risk factor for its onset and maintenance (Gottfredson & Hirschi, 1990). Dodge and Pettit (2003) outlined a biopsychosocial model of conduct problems, which acknowledges the bidirectional interactions between biological dispositions, cognitive and emotional processes, parent and peer influences, and conduct problems in adolescence. Additionally, dynamic systems theory recognizes that there are interrelated systems in one's environment, such as parenting behaviors, peer influences, and social and structural factors of neighborhood organization, which simultaneously interact with person-level characteristics to augment or mitigate risk for its occurrence (Chung & Steinberg, 2006; Granic & Patterson, 2006).

Traditionally, it was assumed that men were more likely than women to engage in antisocial behaviors because men were overrepresented in the criminal justice system. However, arrest rates for men have decreased while arrest rates for women have increased (Javdani et al., 2011). Among adolescents, both male and female youths are involved in antisocial behavior, and some research suggests that girls follow similar antisocial pathways to boys, involving social, familial, and neurodevelopmental risk

factors as children and adverse consequences as adults (Odgers et al., 2008). In a large sample of preadolescents, Veenstra et al. (2006) found that boys scored significantly higher than girls on antisocial behavior. Additionally, boys scored higher on frustration than girls, while girls scored significantly higher on effortful control than boys, and girls perceived more emotional warmth (i.e., acceptance-involvement) from their parents than boys. As will be explained in the following chapters, these variables are all relevant to the discussion of antisocial behavior. But in terms of the correlations between these variables and antisocial behavior, which were significant for both boys and girls ( $ps < .01$ ) in the Veenstra et al. (2006) study, there was not a significant sex difference in how each of them related to antisocial behavior. In other words, the ways in which the correlates of antisocial behavior relate to each other and to antisocial behavior seem to be similar between boys and girls. Nonetheless, while the gender gap seems to be narrowing, remaining differences between male and female adolescents in the prevalence rates of antisocial behavior may reflect differences in other etiological factors that are specific to the gender of the child or adolescent (Javdani et al., 2011).

**Should we be alarmed?** Formerly, it was believed that antisocial behavior was prevalent and normative during the adolescent years; now it is acknowledged that there are also many adolescents who abstain from antisocial behavior altogether or who only engage in very low levels of antisocial behavior for a circumscribed period (Moffitt, Caspi, Harrington, & Milne, 2002). Policy makers may point to police reports and court records as evidence that antisocial behavior among adolescents is a legitimate reason for concern. Yet Egan, Neary, Keenan, and Bond (2012) found that some adult residents in economically disadvantaged neighborhoods perceive adolescent residents as a

heterogeneous group and they recognize that not all adolescents engage in antisocial behavior.

Research suggests that among those who do commit antisocial acts, there are some who do so during their youth only and there are some who begin offending in their childhood and continue offending in their adult years as well (Moffitt, 1993). As one might expect, chronic offending is associated with a host of negative outcomes which are named later. What may be less expected is that individuals who engaged in antisocial behaviors during their adolescent years only were also likely to carry adverse consequences into their adult years, including impulsive personality traits, mental-health problems, substance dependence, financial problems, and property offenses (Moffitt et al., 2002). In contrast, their abstaining counterparts were virtually free of these adjustment problems when they were assessed at age 26 years (Moffitt et al., 2002). Similarly, Willoughby et al. (2007) found that high school students who were completely non-involved in nine risk behaviors, when compared to other high school students with greater degrees of involvement, had the most positive self-reports in each of the developmental domains that were assessed.

Even though some adolescents engage in very low levels of antisocial behavior, the prevalence rate of serious, repetitive offending is around eight percent (Tolan & Loeber, 1993). Fergusson, Horwood, and Nagin (2000) identified a “chronic offenders” group using mixture modeling which comprised 6% of their sample. Similarly, White, Bates, and Buyske (2001) identified a persistent delinquency trajectory which consisted of 7% of their sample. More recently, Hyde, Shaw, and Hariri (2013) reported that the lifetime prevalence of conduct disorder in the United States is 12% for male adolescents

and 7% for female adolescents. Even though the youth crime rate in Canada has substantially declined since 1991, these more recent estimates suggest that antisocial behavior affects a consistent proportion of adolescents in North America. And even though there have been fewer apprehensions of youth for property-related offenses, there have been considerably more apprehensions of youth for violence-related crimes (Taylor-Butts & Bressan, 2006).

### **The Development of Antisocial Behavior**

**Moffitt's taxonomy and suggested revisions.** As briefly mentioned, Moffitt's (1993) description of two groups of offenders specifies a life-course persistent group and an adolescence-limited group. These groups differ on the timing and duration of their antisocial behavior, and they likely have different factors affecting their onset as well. The relatively few individuals on the life-course persistent pathway are characterized by an early childhood onset and antisocial behavior that is continuous (Moffitt, 1993). Offenders on this pathway may be regarded as pathological as they typically display deficits in social and familial systems and in neuropsychological development (Moffitt, 1993). For instance, poor verbal intelligence and a difficult temperament are predictors of early onset offending (Van Lier, Wanner, & Vitaro, 2007).

The adolescence-limited pathway on the other hand represents a more common and normative subgroup of individuals responding to the maturity gap between biological and social maturity. It is during this lag that individuals may be particularly vulnerable to mimic their life-course persistent counterparts to achieve a more mature social status (Moffitt, 1993). For this group, antisocial behavior is transient; it has its onset in adolescence and it does not persist into adulthood (Van Lier et al., 2007). Odgers et al.

(2008) found that individuals who followed the life-course persistent pathway engaged in consistently high levels of antisocial behavior that began at a young age, whereas those who followed the adolescence-limited pathway did not show onset of high antisocial behaviors until they reached their adolescent years.

After two decades since the publication of Moffitt's seminal paper and with the simplicity of its presented taxonomy in mind, Fairchild, van Goozen, Calder, and Goodyer (2013) conducted a literature review to compare the two pathways. They found that the severe antisocial behavior of the late onset group is rarely limited to adolescence, and that their behavior is related to emotion processing deficits and increased callous-unemotional traits in a similar fashion as that of the early onset group. In the same vein, they found that not only is the childhood-onset group related to neurodevelopmental risk but that the adolescence-onset group has neurodevelopmental origins to their behavior as well. Therefore, they concluded that the two groups may differ more along quantitative lines as opposed to qualitative ones, and they recommended a revision of Moffitt's developmental taxonomic theory that is comprised of five clusters of children instead of two. In addition to Moffitt's two groups, Fairchild et al. (2013) found support for three other groups: normative experimentation, adolescence-onset persistent, and childhood-limited. It is commonly held that these groups vary from each other by function of individual and environmental risks, but at the very least, the various pathways speak to the heterogeneity among those who engage in antisocial behavior.

For the current research, it is important to clarify that the adolescent participants may be on any number of pathways. However, it is beyond the scope of this research to ascertain which individuals began in their childhood and which individuals will continue

offending in their adult years. Rather, the purpose will be to show how various parenting and temperament factors are related through indirect paths to increasing antisocial behavior during early-to-mid adolescence in a large community sample.

**Frick and Viding's developmental psychopathology view.** According to a developmental psychopathology perspective, Frick and Viding (2009) reviewed literature relating to antisocial behavior, which they defined as criminal and aggressive behaviors that violate the rights of others or major societal norms. Their aim was twofold: not only did they wish to present a coherent causal model of antisocial behavior, but they also wished to illustrate important developmental concepts like equifinality and multifinality, abnormal and normal development, and multiple levels of analysis.

Frick and Viding (2009) began by summarizing the ways in which antisocial behavior is commonly differentiated. For example, oppositional defiant disorder is diagnosed on the basis of argumentative, noncompliant, oppositional behaviors, whereas conduct disorder is diagnosed on the basis of aggressive, destructive, deceitful, norm-violating behaviors. They also pointed out that antisocial behaviors can be overt or covert, that aggressive behavior can be reactive or proactive, and that trajectories of antisocial behavior can differ between individuals over time (e.g., differences in degrees of stability and change, including increases and decreases). In terms of personality, antisocial individuals tend to be low on agreeableness and conscientiousness (Kokkinos, Karagianni, & Voulgaridou, 2017), the personality equivalents of affiliation and effortful control, respectively, lack empathy and guilt, callously use others, and show grandiose, narcissistic attitudes (Gini, Pozzoli, & Bussey, 2015), however, only a small subgroup of individuals with chronic antisocial behavior show psychopathic traits.

Frick and Viding (2009) argued that with respect to the early versus late onset distinction, there are differences not only in the age of onset and developmental trajectories, but also in the processes involved over time including dispositional and contextual risk factors. For instance, early onset offenders tend to show deficits that are indicative of neuropsychological (e.g., executive function) and cognitive (e.g., intelligence) processes, a finding that is consistent with work by Sorge, Skilling, and Toplak (2015). Further, there exist temperamental differences in offenders with respect to impulsivity, attention, and emotion regulation problems. They also presented evidence indicating the role of callous-unemotional traits in further differentiating child-onset antisocial behaviors. In terms of family factors, individuals with early onset antisocial behaviors have greater family instability, family conflict, and parents who demonstrate poorer parenting strategies. In contrast, those in the adolescent onset group tend to be more rebellious and more rejecting of conventional values than a control group of individuals with no antisocial behavior. Their distinctions were reminiscent of Moffitt's groups, but at the same time they also offered valuable insights regarding the multifaceted nature of antisocial behavior and its developmentally-situated risk factors.

**A diagnostic perspective on the development of antisocial behavior.** The relevance of developmental theories of antisocial behavior can also be noted from a clinical perspective. Editions of the *Diagnostic and Statistical Manual of Mental Disorders* prior to the fourth edition (e.g., *DSM-III*; American Psychiatric Association, 1980; 1987) distinguished conduct disorder on the basis of aggressive versus non-aggressive rule-breaking behaviors. There has been a shift, however, in the field of clinical psychology to describe common forms of psychopathology including antisocial

behavior in dimensional as opposed to categorical terms (Rutter, 2011). Moreover, antisocial behavior varies continuously across the population (Burt, 2012), and across the human lifespan as well. Accordingly, in the *DSM-IV* (APA, 1994), conduct disorder was distinguished based on age of onset whether emerging in childhood or adolescence, a distinction that is in line with a developmental taxonomy of antisocial behavior (Moffitt, 1993).

In other words, the *DSM-IV* (APA, 1994) acknowledged the importance of underlying developmental differences in subgroups of individuals with conduct disorder. Now, with the recent release of the *DSM-V* (APA, 2013), differences are implied with respect to temperament as well. Although diagnostic criteria for conduct disorder remains relatively the same between the two editions, diagnosis of the disorder may now be made with a callous-unemotional specifier (also referred to as a limited prosocial specifier), for those individuals who show a lack of empathy and low guilt in multiple social interactions. This change accounts for the role that individual differences in temperament, namely fearfulness and affiliation, have on the developmental trajectories or prognoses of those who engage in clinically-elevated levels of antisocial behavior. In accordance with this revision, the current studies assess the degree to which affiliation, frustration, and effortful control remains stable or changes over time in relation to authoritative parenting.

It has been postulated in the discussion of differentiated antisocial behavior, that there may be developmental differences between physical aggression and non-aggressive rule-breaking (Burt, 2012). For instance, physically aggressive antisocial behaviors show more rank-order stability or consistency over time than do non-aggressive antisocial behaviors (Stanger, Achenbach, & Verhulst, 1997). That is, young children who exhibit



the highest levels of physical aggression are likely to exhibit similar levels of aggression in adulthood. By contrast, non-aggressive antisocial behaviors are thought to show less stability. Second, physically aggressive antisocial behavior is most frequent during toddlerhood between the ages of 2 and 4 years, occurring in more than 65% of preschoolers and then it steadily decreases over time in most individuals. Indeed, physical aggression peaks at about 2.5 years and gradually decreases over time (Tremblay et al., 1997), and even though the physical aggression of adults may be found in toddlers, most aggressive toddlers will not become aggressive adolescents or adults (Séguin, 2004). In adulthood, the majority of aggressive acts are conducted by less than 10% of the population, a small group of early-onset individuals (Odgers et al., 2008). In contrast, the developmental pattern of non-aggressive antisocial behavior shows a low prevalence in childhood, and then dramatically increases, reaching its peak frequency during adolescence (Barker et al., 2007), after which point it decreases somewhat during the transition to adulthood.

### **Purpose of the Present Dissertation**

The aim of the present dissertation was derived from four key domains. These domains include societal, practical, methodological, and theoretical grounds.

**Societal justification.** First, crime negatively impacts society at the individual level, and at the level of the surrounding families, schools, and communities. For example, with respect to the offender, antisocial behavior in adolescence is related to continued violent behaviors, mental and physical health problems, and financial challenges in adulthood (Odgers et al., 2008). In addition, Harford and Muthén (2000) found a positive relation between the frequency of various antisocial behaviors

committed in the past year in a group of 15- to 22-year-old male and female adolescents and alcohol use disorders fourteen years later. More broadly, there are deleterious effects experienced by those who are directly and indirectly victimized. In a study of twelve focus groups comprised of adult residents from socially disadvantaged neighborhoods in the United Kingdom, antisocial behavior was perceived by group members to be a serious issue in the neighborhoods in which they lived (Egan et al., 2012). When individuals are victims of antisocial behaviors, they are put at greater risk for developing posttraumatic stress, major depressive, and substance use disorders (Ford, Elhai, Connor, & Frueh, 2010). Adolescent antisocial behavior can negatively impact society in ways that are costly, far-reaching, and sometimes long-lasting.

**Practical implications.** Second, this line of research has important practical or clinical implications, as conduct problems and antisocial behaviors are necessary features to the diagnosis of conduct disorder and antisocial personality disorder. Indeed, most of the violence and antisocial behavior perpetrated by youth would qualify them for a diagnosis of conduct disorder (Loeber & Farrington, 2000). As well, conduct disorder in adolescence (i.e., prior to the age of 15 years old) is a necessary precursor to antisocial personality disorder in adulthood (APA, 2000). By understanding how antisocial behaviors develop in individuals over time, and by identifying groups of adolescents who are at greater risk for serious and persistent involvement in them, existing treatments and interventions that directly address the etiological nature of these behaviors may be improved. For example, evidence-based methods such as the Parent Management Training – Oregon Model (PMTO; Forgatch & Patterson, 2010) teach individuals how to improve parent-child relations, how to strengthen effortful control abilities, or how to

respond to pressure from peers, and have been shown to lessen the likelihood of recidivism among youth with vulnerabilities.

**Methodological rationale.** Third, this dissertation is situated within the methodological context of longitudinal approaches in research design, in this case by using cross-time path analyses. Specifically, I will assess the possibility that effortful control, affiliation, and frustration are intervening variables in the indirect relations between authoritative parenting and antisocial behavior among male and female youth. In other words, the methods used in these studies examine influences of temperament and environment, and their associations in predicting a behavioral outcome spanning several years in adolescence (Yamagata, Takahashi, Kijima, Maekawa, Ono, & Ando, 2005). Moreover, I also assess whether adolescent temperament relates to changes in authoritative parenting over time, through its intermediate effect on antisocial behavior. Much prior research in this area has used cross-sectional data or has not adequately examined indirect effects, especially in the adolescent population (e.g., Finkenauer, Engels, & Baumeister, 2005; Larsson, Viding, Rijdsdijk, and Plomin, 2008; Van Petegem, Soenens, Vansteenkiste, & Beyers, 2015). The current dissertation involves questionnaire data supplied by adolescents and their mothers. Thus, data analyses for the following studies benefit from multiple perspectives, and can include comparisons based on the source of information provided.

**Theoretical bases.** Finally, dynamic systems theory provides the groundwork for integrating multiple predictors from a variety of informants together in the proposed models. Granic and Patterson (2006) put forward a comprehensive model of antisocial behavior based on principles from dynamic systems theory with a focus on coercive

interactions between parents and their children as well as social learning mechanisms via parent and peer processes. Dodge and Pettit (2003) presented a biopsychosocial model of adolescent conduct problems which acknowledges reciprocal influences between biological dispositions and life experiences with parents and peers, as well as the cognitive and emotional processes within the child which contribute to the development of chronic conduct problems. Thus, the theoretical context of the proposed studies is founded on the work of prominent researchers such as Gerald Patterson (2006) and Terrie Moffitt (1993) who instigated much scientific enquiry regarding different developmental pathways of antisocial behavior, and the likelihood that adolescent temperament and behavior have reciprocal influences on parenting.

Through this introductory review of the literature, and through the following studies, I aim to expand current knowledge of the developmental perspective of antisocial behavior in adolescents. My specific contribution to the literature is twofold: first, to show how multiple aspects of authoritative parenting uniquely relate to changes in adolescent temperament over time which relates to adolescent antisocial behavior, and second, to show how adolescent temperament traits uniquely relate to changes in antisocial behavior over time which relates to multiple aspects of maternal parenting.

### **Structure of the Present Dissertation**

In this chapter, I provide a general overview of the literature pertaining to antisocial behavior in adolescence, with a focus on the variables relating to my own research, specifically authoritative parenting, and temperamental effortful control, affiliation, and frustration. I discuss definitional issues with respect to antisocial behavior,

and I describe developmental research of temperament and antisocial behavior in adolescence to build a theoretical and empirical framework for the proposed studies.

In Chapters 2 through 4 I report the methods and results of studies 1, 2, and 3 in which there were 521 adolescents between the ages of 10 and 15 years old at time 1 and between 11 and 17 years old at time 2. Adolescents self-reported their mother's authoritative parenting, their own temperament (effortful control, affiliation, and frustration) and their own antisocial behavior at two points in time with an interval of 18 months between each wave of data collection. Mothers also completed measures concerning their own parenting, as well as their adolescent's temperament. Path analyses were used to assess whether there was an indirect effect between authoritative parenting dimensions and adolescents' antisocial behavior over time through adolescent temperament, and whether temperament predicted changes in parenting over time through an intermediate effect with antisocial behavior. In general, authoritative parenting was expected to relate positively to adolescent effortful control and affiliation which were each expected to relate to lower levels of antisocial behavior, and authoritative parenting was expected to relate to lower levels of frustration and thus less antisocial behavior. In the models examining reciprocal effects, adolescent effortful control and affiliation were expected to relate to lower levels of antisocial behavior which was expected to relate to more authoritative parenting, whereas frustration was expected to relate to higher levels of antisocial behavior which was expected to relate to poorer parenting. Parenting data provided by mothers was used to evaluate the goodness-of-fit of analogous models from different perspectives, and temperament data provided by

mothers was used to create a composite variable with the adolescent-reported temperament data.

Finally, in Chapter 5, I provide a general discussion of the studies and how the findings may be integrated into a more comprehensive view. Herein I also highlight important implications for treatment and intervention programs, discuss strengths and contributions of the current dissertation, and make recommendations concerning future research.

### **Pertinent Research in the Antisocial Behavior Literature**

**Parenting and antisocial behavior.** There is an extensive amount of research to indicate a link between adolescent antisocial behavior and parent-related factors such as having a convicted parent (Farrington, 2000), experiencing parental divorce (Burt, Barnes, McGue, & Iacono, 2008), engaging in destructive conflict resolution styles with parents (Van Doorn, Branje, & Meeus, 2008), broad parenting styles that are neglectful or indulgent (Steinberg, Darling, & Fletcher, 1995), and specific parenting traits like low parental knowledge and trust (Keijsers, Frijns, Branje, & Meeus, 2009; Kerr, Stattin, & Trost, 1999; Stattin & Kerr, 2000).

The current dissertation focuses on the dimensions of the authoritative parenting style, which, along with the authoritarian, neglectful, and permissive-indulgent parenting styles, are configured according to two dimensions of parenting: (a) responsiveness, a quality that involves warmth and support; and (b) demandingness, a quality that entails structure and control (Baumrind, 1971; Maccoby & Martin, 1983; Prinzie, Dekovic, Reijntjes, Stams, & Belsky, 2009). Authoritative parents tend to show responsiveness and demandingness to equal extents.

In accordance with these two dimensions, the authoritative parenting style is operationalized by prominent researchers in this field as involving three factors, psychological autonomy granting, acceptance-involvement, and monitoring knowledge (Gray & Steinberg, 1999). Psychological autonomy granting is the degree to which parents show respect for and encouragement of their child's autonomy especially by using non-coercive, democratic discipline (Gray & Steinberg, 1999; Muhtadie, Zhou, Eisenberg, & Wang, 2013). Parental acceptance-involvement is the child's perception of the parent as warm, loving, and responsive. Monitoring knowledge is the degree to which parents are knowledgeable about their children's activities, friendships, and whereabouts (Gray & Steinberg, 1999), and it may be gained by parents soliciting information, adolescents spontaneously disclosing information, or parents issuing family rules or setting limits regarding how and where adolescents are expected to spend their time (Stattin & Kerr, 2000).

Previous research involving these types of variables has found significant linear and nonlinear effects for the three dimensions of authoritative parenting on behavioral outcomes such as antisocial behavior, or aggression more specifically. First, psychological autonomy granting is negatively related to adolescent delinquent behavior over time (De Kemp, Scholte, Overbeek, & Engels, 2006). Pettit, Laird, Dodge, Bates, and Criss (2001) found that high levels of psychological control (a related but distinct construct of psychological autonomy) were associated with more delinquent problems for girls, and for adolescents who had fewer delinquent problems in preadolescence. With respect to acceptance-involvement, Gray and Steinberg (1999) found it to be negatively related to behavior problems in a large sample of 14- to 18-year-olds, and Feinberg,

Button, Neiderhiser, Reiss, and Hetherington (2007) found evidence that parental warmth and responsiveness is a moderator of genetic factors on antisocial behavior. The relation was such that at low levels of warmth, genetic factors accounted for almost all the variance in antisocial behavior (90%), whereas at high levels of warmth, the contribution of genetic factors dropped to almost zero. Lastly, monitoring knowledge is, in the same way as the other parenting dimensions, inversely related with problem behaviors like substance abuse and delinquency (e.g., Brown, Mounts, Lamborn, & Steinberg, 1993; Fletcher, Darling, & Steinberg, 1995; Loeber & Dishion, 1983; Loeber & Stouthamer-Loeber, 1987; Patterson & Dishion, 1985). Patterson (1993) found that poor parental monitoring and ineffective discipline (e.g., limit setting) in a sample of 206 families accounted for the initial status of antisocial behavior in grade 4 boys.

Sometimes, however, parenting is studied as a unitary construct. For example, Chung and Steinberg (2006) combined the measures of knowledge and warmth into a single measure of parenting. When studied this way, authoritative parenting is associated with positive outcomes in children and adolescents, and as such, it is commonly viewed as a favorable parenting style in North American culture (e.g., Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994; Steinberg et al., 1995). Additionally, Zhou et al. (2008) found that authoritative parenting was related to a reduction in externalizing behaviors. However, in this dissertation, the authoritative parenting style is analyzed according to the three main dimensions, psychological autonomy granting, acceptance-involvement, and monitoring knowledge, which itself is further differentiated into parental knowledge per se, tracking, and limit setting, because of theoretical and empirical reasons (e.g., a factor analysis).



Maternal parenting data based on adolescent and mother report are included as predictors in each of the present studies, but the analyses allow for the testing of reciprocal effects as well in which parenting is considered the outcome. Another significant correlate of antisocial behavior, and one that is influenced by parenting, is temperament.

**Temperament and antisocial behavior.** Regarding the individual level of influence, there are several authors who have posited theories about how various temperament traits can increase the risk of antisocial behavior (e.g., DeLisi & Vaughn, 2014; Nigg, 2006). There are also various studies which have shown important links between temperament traits and antisocial or delinquent behavior (e.g., Rothbart, 2007). Temperament consists of individual differences in emotional reactivity and self-regulatory ability (Rothbart, Derryberry, & Posner, 1994). Such differences are evident during infancy and early childhood (Bates & Pettit, 2007) as they are mostly biologically based and genetically inherited (Capaldi & Rothbart, 1992; Yamagata et al., 2005). Most estimates of heritability fall within the range of .20 to .60 (Saudino, 2005).

This implies that the remaining 40% to 80% of the phenotypic variance in temperament is related to environmental factors (Saudino, 2005). As is often the case with other genetically influenced systems, temperament is an open system that is relatively stable, which means that temperament traits develop within the context of their environment, with high rank-order stability (Bates & Pettit, 2007). Indeed, when describing self-regulation, Gardner, Dishion, and Connell (2008) conceptualized it as an “individual difference dimension...that develops over time through transactional processes among constitutionally-based differences in reactivity and regulation, maturation of the executive attention system, and socialization through educational and

social experiences in school, family, and peer contexts” (p.274). It is helpful to keep in mind that effortful control represents both an individual difference factor as well as a socio-emotional skill set that can mature over time. Affiliation and frustration, similarly, are aspects of temperament that reflect both stable, individual differences, as well as reactive traits that may be influenced by parenting.

***Emotional reactivity.*** As mentioned, temperament involves two processes that should theoretically relate to antisocial behavior, the first of which is emotional reactivity. Reactivity is physiologic and emotional arousal that motivates an individual to respond to a change in his or her environment (Rothbart & Rueda, 2005). Temperamental reactivity includes several factors: affiliativeness, surgency which is comprised of high intensity pleasure and low fear, and negative reactivity which includes frustration (Capaldi & Rothbart, 1992; Ellis & Rothbart, 2001). Surgency and approach are positively related to externalizing problems (Rothbart, 2007) and overt antisocial behavior (Buil, van Lier, Brendgen, Koot, & Vitaro, 2017), low fearfulness may lead to more covert antisocial behaviors like vandalism and theft (Frick & Morris, 2004), and frustration is positively related to aggression (Berkowitz, 1993; Reker, 2010). Higher negative emotionality (which includes fear and frustration) was found to be related to more antisocial behavior toward peers ( $r = .36$ ) in a large sample of adolescents (Snyder et al., 2015), and to more antisocial behavior in a longitudinal study of 6- to 15-year-olds (Buil et al., 2017). To date, there is little research exploring the link between temperamental affiliation and antisocial behavior, but considering its relation to empathy and agreeableness, both conceptually and empirically, it is expected to be related to lower levels of antisocial behavior.

Fearfulness is an important temperament trait in related literatures concerning a severe, chronic group of offenders with callous-unemotional traits in children and adolescents, and psychopathic traits in adults. It serves as an emotional or reactive type of self-regulation. Even though this temperament trait is not included in the studies that comprise this dissertation, a brief discussion of how fearfulness relates to the behavioral inhibition system is provided (see Appendix B). Also, because self-regulation is an umbrella term with many related constructs, an overview of similar terms and how they are characterized in developmental research is provided (see Figure 1.1). In contrast to fearfulness, which is an automatic inhibitor of behavior, effortful control is a more deliberate, cognitive process by which antisocial behavior can be inhibited.

***Effortful control.*** Following emotional reactivity, the second process of temperament is self-regulatory in nature and is termed effortful control. Paper-and-pencil measures of effortful control are often comprised of activation control (performing an action when there is a strong tendency to avoid it), inhibitory control (suppressing inappropriate responses), and attention control (focusing and shifting attention) (Rothbart & Rueda, 2005). There is also empirical evidence that effortful control is inversely related to antisocial behavior. For example, Eisenberg et al. (2005) found that effortful control at age 11 years was related to lower levels of externalizing problems at age 13 years. Lengua (2006) found that increases in effortful control predicted lower externalizing problems over three years in a sample of 8- to 12-year-old children at the time of first assessment. Finally, Snyder et al. (2015) found that higher effortful control was associated with less antisocial behavior toward peers ( $r = -.45, p < .001$ ) in a large sample of adolescents.

## Self-Regulation

Term	Research Area	Definition	Includes	Developmental Implications
Coping	Stress & Coping	Minimizing the impact of perceived threat or challenge	Down-regulation and mobilisation of certain emotions, thoughts, and behaviors	Functions of higher-order families of coping correspond to lower-order ways of coping that are developmentally graded members of the same family
Delay of Gratification	Willpower	Forgoing a more immediate, less preferred outcome to attain a more preferred outcome in the future	A cognitive ‘cool’ system and an emotional ‘hot’ system	Increases with age, due to the development of self-regulatory strategies (e.g., ability to allocate attention away from the desired object)
Effortful Control	Temperament	Ability to voluntarily control emotional reactivity (surgency and negative affect)	a) Inhibition b) Activation c) Attentional control processes	Increases in the first four years of life with maturation of the nervous system (executive attention); individual differences due to socio-emotional development
Ego Control	Personality	Threshold of an individual to contain or express impulses, feelings, and desires	May be passive or reactive, and functions mostly beyond people’s awareness	High rank-order stability between the ages of 4 and 23; undercontrol can relate to externalizing and overcontrol can relate to internalizing symptoms
Emotion Regulation	Emotion	Regulating intensive and temporal features of emotions, to accomplish one's goals	Monitoring, evaluating, and modifying emotions (e.g., cognitive reappraisal)	Transitions from regulating by others to self-initiated regulation with increasing dependence on mentalistic strategies
Executive Function	Cognitive neuroscience and clinical psychology	Mental processes and skills that are necessary for the cognitive control of behavior	Inhibitory control, working memory, attention, problem-solving, planning	Can be improved or adversely affected by life events; develops with frontal lobe maturation
Self-control	Developmental psychology	Conscious, wilful, control that regulates socially unacceptable and undesirable impulses	Includes down-regulating unwanted responses of the self, and activating wanted ones at the same time	Can be strengthened by repeated practice and exercise of self-control (e.g., resisting temptation)

*Figure 1.1.* Reference guide describing terms that are related to the construct of self-regulation.

**How does temperament develop?** In a seminal paper on temperament by Goldsmith et al. (1987), commentator Robert McCall contributes that the major elements of temperament are present early in life and are strongly influenced by biological factors. He notes that as development continues, temperament becomes influenced more by one's environment and context. Recently these assumptions about temperament have been revised in an article by Shiner et al. (2012), in which it is stated that, first, not all temperament traits are stable early in life, and temperament traits show more stability with age (generally heterotypic rather than homotypic). Second, the original definition did not include dimensions of attention or self-regulation, which are now understood to be important aspects of temperament. Third, biological and environmental factors are more interactive than successive as originally believed, in that they work together throughout development. Shiner et al. (2012) summarize their definition as such: "Temperament traits are early emerging basic dispositions in the domains of activity, affectivity, attention, and self-regulation, and these dispositions are the product of complex interactions among genetic, biological, and environmental factors across time" (p.437). With this definition in mind, the current dissertation integrates multiple factors to understand how antisocial behavior develops over time in relation to parenting and temperament, and how temperament may predict changes in parenting over time directly or through antisocial behavior.

### **Integrating Parenting and Temperament with Antisocial Behavior**

Understanding the inherent complexity of antisocial behavior requires one to think about the naturally interwoven systems within which antisocial behavior may occur. As indicated in a review by Kiff, Lengua, and Zalewski (2011), there have been studies

which have integrated parenting, temperament, and some aspect of externalizing behavior, even including the analyses of reciprocal effects. However, the current research is novel in that temperament has been more widely studied in childhood compared to adolescence, even though parenting and temperament may be related differently to antisocial behavior in adolescence than earlier in development. Given greater experimentation with antisocial behavior (e.g., Moffitt, 1993), and greater autonomy of adolescents from parents than in childhood (e.g., Delhay et al., 2012), it is crucial to examine these relations during adolescence. Furthermore, although much research on temperament and antisocial behavior focuses on effortful control, the current studies broaden the focus to also include lesser studied temperament traits, frustration and affiliation. Finally, the current studies provide a more systematic analysis of bidirectional indirect effects than has been researched before. Accordingly, the current dissertation is comprised of three main studies, each with two research questions, that form the primary focus of this dissertation, a developmental integration of parenting, temperamental effortful control, affiliation, and frustration, in elucidating adolescent antisocial behavior.

First, it is explored whether the development of effortful control can be fostered and nurtured in a family context where the adolescent experiences parental warmth and responsiveness, is granted emotional autonomy and individuality, and receives age-appropriate monitoring and boundaries. In addition, this study also explores whether effortful control avails adolescents with the regulatory skills necessary to lessen one's involvement in antisocial behavior, as suggested by theorists DeLisi and Vaughn (2014), and therefore relate positively to maternal parenting.

Second, it is explored whether authoritative parenting is related to antisocial behavior through temperamental affiliation, and whether affiliation is related to parenting through antisocial behavior, as there is research to show that parents can influence their children's temperament and vice versa. As suggested by previous research and theory, some antisocial children may have low affiliation (e.g., Ellis & Rothbart, 2001; Nigg, 2006; Zhang & Wang, 2012), in that they lack the desire for relational closeness and are generally not described as warm and friendly with others.

Finally, it is examined whether frustration helps explain the relation between authoritative parenting dimensions and adolescent's involvement in antisocial behavior, and whether frustration accounts for changes in parenting through antisocial behavior. Adolescents who experience strict limit setting and low levels of psychological autonomy granting may develop greater frustration over time (e.g., Van Petegem et al., 2015) and thus may be more likely to engage in antisocial behavior (e.g., DeLisi & Vaughn, 2014; Nigg, 2006). A summary of the studies that comprise this dissertation, the informants who responded to the various measures, and their respective research questions is shown in Table 1.1.

Table 1.1

*Summary of research questions, measures, and informants for each study*

<b>Study</b>	<b>Research Questions</b>	<b>Measures</b>	<b>Informants</b>
1	Is there an indirect effect between authoritative parenting and antisocial behavior over time through adolescent effortful control?	Authoritative Parenting	Adolescent, mother
		Early Adolescent Temperament Questionnaire-Revised	Adolescent, mother
	Is there an indirect effect between effortful control and parenting through antisocial behavior?	Self-Report Delinquency Questionnaire	Adolescent
2	Is there an indirect effect between authoritative parenting and antisocial behavior over time through adolescent affiliation?	Authoritative Parenting	Adolescent, mother
		Early Adolescent Temperament Questionnaire-Revised	Adolescent, mother
	Is there an indirect effect between affiliation and parenting through antisocial behavior?	Self-Report Delinquency Questionnaire	Adolescent
3	Is there an indirect effect between authoritative parenting and antisocial behavior over time through adolescent frustration?	Authoritative Parenting	Adolescent, mother
		Early Adolescent Temperament Questionnaire-Revised	Adolescent, mother
	Is there an indirect effect between frustration and parenting through antisocial behavior?	Self-Report Delinquency Questionnaire	Adolescent



Collectively, these three studies build on the generally accepted premise that authoritative parenting is related to antisocial behavior over time, but also that parenting can relate to changes in effortful control, affiliation, and frustration in adolescents, which can each themselves be related to antisocial behavior, the first two negatively and the third positively. Thus, teenaged children may participate in or abstain from antisocial behaviors via multiple paths. By integrating these important correlates of antisocial behavior in such a way as will be explained further in the next three chapters, the proposed research will make beneficial contributions to our emergent understanding of this construct, which itself is inherently complex and manifests itself in varied ways across cultures, generations, and within the human lifespan.

As mentioned earlier, one of the advantages of the current research is that the proposed studies benefit from the multiplicity of perspectives, that is, authoritative parenting and adolescent temperament measures were rated from the perspectives of two informants: the adolescent and his or her mother. This allows for the effects of shared method variance to be minimized. It also permits comparisons to be made across models using data collected from different informants to assess the degree to which different perspectives may influence the results. Antisocial behavior was always reported by the adolescent, and all the measures used were the same for the duration of the study.

### **Gaps in Previous Research and the Proposed Dissertation**

As can be seen through this introduction, the literature concerning antisocial behavior is extensive. It is larger still in that it can encompass similar topic areas such as aggression, externalizing problems, conduct disorder, delinquency, and callous-unemotional traits (Gini, Pozzoli, & Bussey, 2015; Hyde et al., 2013). Altogether, there

have been many theories and models proposed and tested to determine the main correlates with which the construct of antisocial behavior is associated, including some of its common antecedents and consequences. More recently, researchers have begun to explore the developmental trajectories of antisocial behavior (Aguilar, Sroufe, Egeland, & Carlson, 2000; Odgers et al., 2008) using a person-centered approach as opposed to a variable-centered one. Individual differences in the various pathways of antisocial behavior, including which factors relate primarily to its onset, maintenance, and desistance are being investigated (Egan, 2011).

With respect to longitudinal studies of adolescents, however, especially those that involve an integrated view of factors that acknowledge stability as well as change, there remains much work to be done (Granic & Patterson, 2006). For that reason, this dissertation considers two key areas that relate to adolescent behavior, which are individual adolescent temperament and authoritative parenting. The literature concerning parenting and temperament is also extensive and diverse, yet still with some gaps. Therefore, the current studies are conducted to enhance our understanding of antisocial behavior in adolescence within an integrated, longitudinal framework. In total, adolescent age, gender, and effortful control, affiliation, and frustration, and authoritative parenting of mothers will be included in the analyses which will be used to test possible indirect effects using half-longitudinal designs. Taken together, the studies will contribute to our knowledge of the important parenting and individual factors involved in the etiology and development of antisocial behavior as well as the reciprocal effects of temperament and antisocial behavior on parenting, by exploring the nature of these relationships in a two-wave panel design. The major contribution of the current dissertation is to show the

longitudinal development of antisocial behavior during early adolescence, as a function of those temperament variables that reflect individual differences in effortful control, affiliation, and frustration, and through which five factors of authoritative parenting may have indirect effects and be indirectly affected.

## References

- Aguilar, B., Sroufe, L.A., Egeland, B., & Carlson, E. (2000). Distinguishing the early-onset/persistent and adolescence-onset antisocial behavior types: From birth to 16 years. *Development and Psychopathology*, 12, 109-132.
- American Psychiatric Association (2000). Diagnostic and statistical manual of mental disorders (4<sup>th</sup> ed., text rev.). Washington, DC: Author.
- American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Washington, DC: Author.
- Barker, E.D., Séguin, J.R., White, H.R., Bates, M.E., Lacourse, É., Carbonneau, R., Tremblay, R.E. (2007). Developmental trajectories of male physical violence and theft relations to neurocognitive performance. *Archives of General Psychiatry*, 64(5), 592-599.
- Bates, J.E., & Pettit, G.S. (2007). Temperament, parenting, and socialization. In J.E. Grusec & P.D. Hastings (Eds.), *Handbook of Socialization: Theory and research* (pp. 153-180). New York: Guilford Press.
- Baumrind, D. (1971). Current patterns of parental authority. *Developmental Psychology Monograph*, 4 (1, Pt. 2).
- Berkowitz, L. (1993). Aggression: Its causes, consequences, and control. Temple University Press, Philadelphia.
- Brown, B.B., Mounts, N., Lamborn, S.D., & Steinberg, L. (1993). Parenting practices and peer group affiliation in adolescence. *Child Development*, 64(2), 467-482.
- Buil, J.M., van Lier, P.A.C., Brendgen, M.R., Koot, H.M., Vitaro, F. (2017). Developmental pathways linking childhood temperament with antisocial behavior and substance use in adolescence: Explanatory mechanisms in the peer environment. *Journal of Personality and Social Psychology*, 112(6), 948-966. doi:10.1037/pspp0000132
- Burt, S.A. (2012). How do we optimally conceptualize the heterogeneity within antisocial behavior? An argument for aggressive versus non-aggressive behavioral dimensions. *Clinical Psychology Review*, 32, 263-279.
- Burt, S.A., Barnes, A.R., McGue, M., & Iacono, W.G. (2008). Parental divorce and adolescent delinquency: Ruling out the impact of common genes. *Developmental Psychology*, 44(6), 1668-1677.
- Capaldi, D.M. & Rothbart, M.K. (1992). Development and validation of an early adolescent temperament measure. *Journal of Early Adolescence*, 12(2), 153-173.

- Chung, H.L. & Steinberg, L. (2006). Relations between neighborhood factors, parenting behaviors, peer deviance, and delinquency among serious juvenile offenders. *Developmental Psychology*, 42(2), 319-331.
- De Kemp, R., Scholte, R., Overbeek, G., Engels, R. (2006). Early adolescent delinquency: The role of parents and best friends. *Criminal Justice and Behavior*, 33(4), 488-510.
- Delhay, M., Kempenaers, C., Burton, J., Linkowski, P., Stroobants, R., & Goossens, L. (2012). Attachment, parenting, and separation-individuation in adolescence: A comparison of hospitalized adolescents, institutionalized delinquents, and controls. *The Journal of Genetic Psychology*, 173(2), 119-141.
- DeLisi, M. & Vaughn, M.G. (2014). Foundation for a temperament-based theory of antisocial behavior and criminal justice system involvement. *Journal of Criminal Justice*, 42, 10-25.
- Dodge, K.A., & Pettit, G.S. (2003). A biopsychosocial model of the development of chronic conduct problems in adolescence. *Developmental Psychology*, 39(2), 349-371.
- Egan, V. (2011). Individual differences and antisocial behavior. In T. Chamorro-Premuzic, S. von Stumm, & A. Furnham (Eds.), *The Wiley-Blackwell Handbook of Individual Differences*, Wiley-Blackwell, Oxford, UK. doi: 10.1002/9781444343120.ch19
- Egan, M., Neary, J., Keenan, P.J., Bond, L. (2012). Perceptions of antisocial behavior and negative attitudes towards young people: Focus group evidence from adult residents of disadvantaged urban neighbourhoods. *Journal of Youth Studies*, 1, 612-627.
- Eisenberg, N., Zhou, Q., Spinrad, T.L., Valiente, C., Fabes, R.A., & Liew, J. (2005). Relations among positive parenting, children's effortful control, and externalizing problems: A three-wave longitudinal study. *Child Development*, 76(5), 1055-1071.
- Ellis, L. K., & Rothbart, M. K. (2001, April). *Revision of the Early Adolescent Temperament Questionnaire*. Poster presented at the biennial meeting of the Society for Research in Child Development, Minneapolis, MN.
- Emler, N. & Reicher, S. (1995). *Adolescence and delinquency: The collective management of reputation*. Oxford: Blackwell.
- Fairchild, G., van Goozen, S.H.M., Calder, A.J., & Goodyer, I.M. (2013). Research review: Evaluating and reformulating the developmental taxonomic theory of antisocial behavior. *Journal of Child Psychology and Psychiatry*, 54(9), 924-940.

- Farrington, D.P. (2000). Psychosocial predictors of adult antisocial personality and adult convictions. *Behavioral Sciences and the Law*, 18, 605-622.
- Feinberg, M.E., Button, T.M., Neiderhiser, J.M., Reiss, D., & Hetherington, E.M. (2007). Parenting and adolescent antisocial behavior and depression: evidence of genotype x parenting environment interaction. *Archives of General Psychiatry*, 64(4), 457-465.
- Fergusson, D.M., Horwood, J.L., & Nagin, D.S. (2000). Offending trajectories in a New Zealand birth cohort. *Criminology*, 38, 525-551.
- Finkenauer, C., Engels, R.C., & Baumeister, R.F. (2005). Parenting behavior and adolescent behavioral and emotional problems: The role of self-control. *International Journal of Behavioral Development*, 29(1), 58-69.
- Fletcher, A. C., Darling, N., & Steinberg, L. (1995). Parental monitoring and peer influences on adolescent substance use. In J. McCord (Ed.), *Coercion and punishment in long-term perspectives* (pp. 259 – 271). Cambridge, MA: Cambridge University Press.
- Ford, J. D., Elhai, J. D., Connor, D. F., & Frueh, B. C. (2010). Poly-victimization and risk of posttraumatic, depressive, and substance use disorders and involvement in delinquency in a national sample of adolescents. *Journal of Adolescent Health*, 46, 545-552.
- Forgatch, M. S., & Patterson, G. R. (2010). Parent Management Training – Oregon Model: An intervention for antisocial behavior in children and adolescents. In J. R. Weisz & A. E. Kazdin (Eds.), *Evidence-based psychotherapies for children and adolescents* (2nd ed., pp. 159-178). New York: Guilford.
- Frick, P.J., Lahey, B.B., Loeber, R., Tannenbaum, L., Van Horn, Y., Christ, M.A.G., Hart, E.A., & Hanson, K. (1993). Oppositional defiant disorder and conduct disorder: A meta-analytic review of factor analyses and cross-validation in a clinic sample. *Clinical Psychology Review*, 13, 319-340.
- Frick, P.J. & Morris, A.S. (2004). Temperament and developmental pathways to conduct problems. *Journal of Clinical Child and Adolescent Psychology*, 33(1), 54-68.
- Frick, P.J. & Viding, E. (2009). Antisocial behavior from a developmental psychopathology perspective. *Development and Psychopathology*, 21, 1111-1131.
- Gardner, T.W., Dishion, T.J., & Connell, A.M. (2008). Adolescent self-regulation as resilience: Resistance to antisocial behavior within the deviant peer context. *Journal of Abnormal Child Psychology*, 36(2), 273-284.

- Gini, G., Pozzoli, T., & Bussey, K. (2015). Moral disengagement moderates the link between psychopathic traits and aggressive behavior among early adolescents. *Merrill-Palmer Quarterly*, 61(1).
- Goldsmith, H.H., Buss, A.H., Plomin, R., Rothbart, M.K., Chess, T.A., Hinde, R.A., & McCall, R.B. (1987). Roundtable: What is temperament? Four approaches. *Child Development*, 58(2), 505-529.
- Gottfredson, M., & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.
- Granic, I. & Patterson, G.R. (2006). Toward a comprehensive model of antisocial development: A dynamic systems approach. *Psychological Review*, 113(1), 101-131.
- Gray, M.R., & Steinberg, L. (1999). Unpacking authoritative parenting: Reassessing a multidimensional construct. *Journal of Marriage and Family*, 61(3), 574-587.
- Harford, T.C. & Muthén, B.O. (2000). Adolescent and young adult antisocial behavior and adult alcohol use disorders: A fourteen-year prospective follow-up in a national survey. *Journal of Studies on Alcohol*, 61, 524-528.
- Hewitt, L.E., & Jenkins, R.L. (1946). Fundamental patterns of maladjustment: The dynamics of their origin. pp.1 – 5. Illinois.
- Hyde, L.W., Shaw, D.S., & Hariri, A.R. (2013). Understanding youth antisocial behavior using neuroscience through a developmental psychopathology lens: Review, integration, and directions for research. *Developmental Review*, 33, 168-223.
- Javdani, S., Sadeh, N., & Verona, E. (2011). Expanding our lens: Female pathways to antisocial behavior in adolescence and adulthood. *Clinical Psychology Review*, 31, 1324-1348.
- Keijsers, L., Frijns, T., Branje, S.J.T., & Meeus, W. (2009). Developmental links of adolescent disclosure, parental solicitation, and control with delinquency: moderation by parental support. *Developmental Psychology*, 45(5), 1314-1327.
- Kerr, M., Stattin, H., & Trost, K. (1999). To know you is to trust you: parents' trust is rooted in child's disclosure of information. *Journal of Adolescence*, 22, 737-752.
- Kiff, C.J., Lengua, L.J., & Zalewski, M. (2011). Nature and nurturing: Parenting in the context of child temperament. *Clinical Child and Family Psychology Review*, 14(3), 251-301.

- Kochanska, G., & Knaack, A. (2003). Effortful control as a personality characteristic of young children: Antecedents, correlates, and consequences. *Journal of Personality*, 71(6), 1087-1112.
- Lamborn, S.D., Mounts, N.S., Steinberg, L., & Dornbusch, S.M. (1991). Patterns of competence and adjustment among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Child Development*, 62, 1049–1065.
- Larsson, H., Viding, E., Rijdsdijk, F.V., & Plomin, R. (2008). Relationships between parental negativity and childhood antisocial behavior over time: A bidirectional effects model in a longitudinal genetically informative design. *Journal of Abnormal Child Psychology*, 36(5), 633-645.
- Lengua, L. (2006). Growth in temperament and parenting as predictors of adjustment during children's transition to adolescence. *Developmental Psychology*, 42(5), 819-832.
- Loeber, R. (1982). The stability of antisocial and delinquent child behavior: a review. *Child Development*, 53, 1431-1446.
- Loeber, R. (1985). Patterns and development of antisocial child behavior. *Annals of Child Development*, 53, 1431-1446.
- Loeber, R. & Dishion, T. (1983). Early predictors of male delinquency: A review. *Psychological Bulletin*, 94(1), 68-99.
- Loeber, R. & Farrington, D.P. (2000). Young children who commit crime: Epidemiology, developmental origins, risk factors, and early interventions, and policy implications. *Developmental Psychopathology*, 12, 737–762.
- Loeber, R. & Schmalting, K.B. (1985). Empirical evidence for overt and covert patterns of antisocial conduct problems: A meta-analysis. *Journal of Abnormal Child Psychology*, 13(2), 337-353. doi: 10.1007/BF00910652
- Loeber, R., & Stouthamer-Loeber, M. (1987). Prediction. In H.C. Quay (Ed.), *Handbook of Juvenile Delinquency* (pp.325-382). New York: John Wiley and Sons.
- Loeber, R., & Stouthamer-Loeber, M. (1998). Development of juvenile aggression and violence: Some common misconceptions and controversies. *American Psychologist*, 53, 242-259.
- Maccoby, E.E., & Martin, J.A. (1983). Socialization in the context of the family: Parent-child interaction. In P.H. Mussen (Ed.) & E.M Hetherington (Vol. Ed.), *Handbook of child psychology: Vol. 4. Socialization, personality, and social development* (4<sup>th</sup> ed., pp. 1-101). New York: Wiley.



- Moffitt, T. E. (1993). Adolescence-limited and life-course persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, 100, 674–701.
- Moffitt, T.E., Caspi, A., Harrington, H., & Milne, B.J. (2002). Males on the life-course-persistent and adolescence-limited pathways: follow-up at age 26 years. *Development and Psychopathology*, 14(1), 179-207.
- Muhtadie, L., Zhou, Q., Eisenberg, N., & Wang, Y. (2013). Predicting internalizing problems in Chinese children: The unique and interactive effects of parenting and child temperament. *Development and Psychopathology*, 25, 653-667.
- Nigg, J.T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 47(3/4), 395-422.
- Odgers, C.L., Moffitt, T.E., Broadbent, J.M., Dickson, N., Hancox, R.J., Harrington, H., Poulton, R., Sears, M.R., Thomson, W.M., & Caspi, A. (2008). Female and male antisocial trajectories: From childhood origins to adult outcomes. *Development and Psychopathology*, 20, 673-716. doi: 10.1017/S0954579408000333
- Pardini, D. A., Lochman, J. E., & Frick, P. J. (2003). Callous/unemotional traits and social cognitive processes in adjudicated youth. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42, 364-371.
- Patterson, G.R. (1993). Orderly change in a stable world: The antisocial trait as a chimera. *Journal of Consulting and Clinical Psychology*, 61, 911-919.
- Patterson, G.R., DeBaryshe, B.D., Ramsey, E. (1989). A developmental perspective on antisocial behavior. *American Psychologist*, 44(2), 329-335.
- Patterson, G.R., & Dishion, T. (1985). Contributions of families and peers to delinquency. *Criminology*, 23(1), 63-79.
- Pettit, G.S., Laird, R.D., Bates, J.E., Dodge, K.A., Criss, M.M. (2001). Antecedents and behavior-problem outcomes of parental monitoring and psychological control in early adolescence. *Child Development*, 72, 583–598.
- Prinz, P., Dekovic, M., Reijntjes, A.H.A., Stams, G.G.J.M., & Belsky, J. (2009). The relations between parents' big five personality factors and parenting: A meta-analytic review. *Journal of Personality and Social Psychology*, 97(2), 351-362.
- Reker, D. (2010). *Relation of temperament and authoritative parenting on subtypes of adolescent aggressive behavior*. Retrieved from Brock University Digital Repository.
- Rothbart, M.K. (2007). Temperament, development, and personality. *Current Directions in Psychological Science*, 16(4), 207-212. doi: 10.1111/j.1467-8721.2007.00505.x

- Rothbart, M. K., Ahadi, S. A., & Hershey, K. L. (1994). Temperament and social behavior in childhood. *Merrill-Palmer Quarterly*, 40, 21-39.
- Rothbart, M.K., Derryberry, D., & Posner, M.I. (1994). A psychobiological approach to the development of temperament. In J.E. Bates & T.D. Wachs (Eds.), *Temperament: Individual differences at the interface of biology and behavior* (pp.83-116). Washington, DC: American Psychological Association.
- Rothbart, M. K., & Rueda, M. R. (2005). The development of effortful control. In U. Mayr, E. Awh, & S. Keele (Eds.), *Developing individuality in the human brain: A tribute to Michael I. Posner* (167-188). Washington, DC: American Psychological Association.
- Rutter, M. (2011). Research review: Child psychiatric diagnosis and classification, concepts, findings, challenges and potential. *Journal of Child Psychology and Psychiatry*, 52(6), 647-660.
- Saudino, K.J. (2005). Behavioral genetics and child temperament. *Journal of Developmental and Behavioral Pediatrics*, 26(3), 214-223.
- Séguin, J.R. (2004). Neurocognitive elements of antisocial behavior: Relevance of an orbitofrontal cortex account. *Brain and Cognition*, 55(1), 185-197.
- Shiner, R.L., Buss, K.A., McClowry, S.G., Putnam, S.P., Saudino, K.J., & Zentner, M. (2012). What is temperament *now*? Assessing progress in temperament research on the twenty-fifth anniversary of Goldsmith et al. (1987). *Child Development Perspectives*, 6(4), 436-444.
- Snyder, H.R., Gulley, L.D., Bijttebier, P., Hartman, C.A., Oldehinkel, A.J., Mezulis, A., Young, J.F., & Hankin, B.L. (2015). Adolescent emotionality and effortful control: Core latent constructs and links to psychopathology and functioning. *Journal of Personality and Social Psychology*, 109(6), 1132-1149.
- Sorge, G.B., Skilling, T.A., & Toplak, M.E. (2015). Intelligence, executive functions, and decision making as predictors of antisocial behavior in an adolescent sample of justice-involved youth and a community comparison group. *Journal of Behavioral Decision Making*, 28, 477-490.
- Stanger, C., Achenbach, T. M., & Verhulst, F. C. (1997). Accelerated longitudinal comparisons of aggressive versus delinquent syndromes. *Development and Psychopathology*, 9, 43-58.
- Statistics Canada. (2015, March). *Canadian Tobacco Alcohol and Drugs (CTADS): 2015 summary*. Retrieved from <https://www.canada.ca/en/health-canada/services/canadian-tobacco-alcohol-drugs-survey/2015-summary.html>

- Stattin, H. & Kerr, M. (2000). Parental monitoring: a reinterpretation. *Child Development*, 71(4), 1072-1085.
- Steinberg, L., Darling, N., & Fletcher, A. C. (1995). Authoritative parenting and adolescent adjustment: An ecological journey. In P. Moen, G. H. Elder, Jr., & K. Luscher (Eds.), *Examining lives in context: Perspectives on the ecology of human development* (pp. 423-466). Washington, DC: American Psychological Association.
- Steinberg, L., Lamborn, S.D., Darling, N., Mounts, N.S., & Dornbusch, S.M. (1994). Over-time changes in adjustment and competence among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Child Development*, 65, 754-770.
- Taylor-Butts, A. & Bressan, A. (2006). Youth crime in Canada, 2006. *Juristat*, 28(3), 1-16.
- Tolan, P.H., Loeber, R. (1993). Antisocial Behavior. In P.H. Tolan & B.J. Cohler (Eds.), *Handbook of Clinical Research & Practice with Adolescents* (pp. 307-331). New York: Wiley & Sons.
- Tremblay, R.E., Boulerice, B., Harden, P.W., McDuff, P., Pélusé, D., Pihl, R.O., et al. (1997). Do children in Canada become more aggressive as they approach adolescence? In *Growing up in Canada* (pp. 127-137) Ottawa: Statistics Canada.
- VandenBos, G.R., & American Psychological Association. (2006). *APA dictionary of psychology* (1st ed.). Washington, DC: American Psychological Association.
- Van Doorn, M.D., Branje, S.J.T., & Meeus, W.H.J. (2008). Conflict resolution in parent-adolescent relationships and adolescent delinquency. *The Journal of Early Adolescence*, 28(4), 503-527.
- Van Lier, P.A.C., Wanner, B., & Vitaro, F. (2007). Onset of antisocial behavior, affiliation with deviant friends, and childhood maladjustment: A test of the childhood- and adolescent-onset models. *Development and Psychopathology*, 19, 167-185.
- Van Petegem, S., Soenens, B., Vansteenkiste, M., & Beyers, W. (2015). Rebels with a cause? Adolescent defiance considered from the perspective of reactance theory and self-determination theory. *Child Development*, 86(3), 903-918.
- Veenstra, R., Lindenburg, S., Oldehinkel, A.J., De Winter, A.F., & Ormel, J. (2006). Temperament, environment, and antisocial behavior in a population sample of preadolescent boys and girls. *International Journal of Behavioral Development*, 30, 422-432.

- White, H.R., Bates, M.E., & Buyske, S. (2001). Adolescence-limited versus persistent delinquency: Extending Moffitt's hypothesis into adulthood. *Journal of Abnormal Psychology, 110*, 600-609.
- Willoughby, T., Chalmers, H., Busseri, M.A., Bosacki, S., Dupont, D., Marini, Z., Rose-Krasnor, L., Sadava, S., Ward, A., & Woloshyn, V. (2007). Adolescent non-involvement in multiple risk behaviors: An indicator of successful development? *Applied Developmental Science, 11*(2), 89-103.
- Yamagata, S., Takahashi, Y., Kijima, N., Maekawa, H., Ono, Y., & Ando, J. (2005). Genetic and environmental etiology of effortful control. *Twin Research and Human Genetics, 8*(4), 300-306.
- Zhang, W., & Wang, D. (2012). Affiliative temperament: Concept, neurobiology, and implications for antisocial behaviors. *Hormones and Signaling, 47*, 8986-8995.
- Zhou, Q., Wang, Y., Deng, X., Eisenberg, N., Wolchik, S.A., & Tein, J-Y. (2008). Relations of parenting and temperament to Chinese children's experience of negative life events, coping efficacy, and externalizing problems. *Child Development, 79*(3), 493-513.

## CHAPTER 2

### **Study 1: Indirect Effects involving Parenting, Effortful Control, and Antisocial Behavior**

Adolescents who are raised in homes with authoritative parents are more likely than their peers to experience positive adjustment outcomes such as prosocial behavior (Padilla-Walker, Carlo, Christensen, & Yorgason, 2012). They are also less likely to engage in problem behaviors like drug and alcohol use and delinquency (Piko & Balázs, 2012; Steinberg, Darling, & Fletcher, 1995). A recent review of studies regarding antisocial behavior that were published between 2003 and 2014 concluded that positive and consistent parenting reduced the antisocial behavior of adolescents (Human-Hendricks & Roman, 2014). In the literature that pertains to antisocial behavior, correlational findings like these seem common (e.g., Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Gray & Steinberg, 1999). One way to interpret the relation between parenting and adolescent behavior is by means of an intervening variable. Cole and Maxwell (2003) expressed an important question to ask of correlations for which causation seems possible, namely, what is the “mechanism of action” whereby the “putative cause has its putative effect” (p.558)? Accordingly, one possible explanation is that there is an indirect relation between parenting and adolescent behavior through effortful control, a component of temperament and a form of self-regulation.

The current study used path analyses of longitudinal data to evaluate whether there is support for an indirect relation between the dimensions of authoritative parenting and adolescent antisocial behavior via effortful control in a community-based sample of male and female adolescents and their mothers. The study was informed by the research

questions “can parents enhance adolescents’ effortful control” and “does adolescent effortful control lessen the likelihood of involvement in antisocial behavior?” There are both conceptual bases and empirically derived reasons to undertake the current study.

### **Authoritative Parenting and Effortful Control**

The first step in understanding the rationale for this study was to consider how authoritative parenting is related to effortful control, the possible intervening variable. While there is mounting evidence of evocative gene-environment correlations whereby parenting behaviors occur in response to a child’s temperament (e.g., Lee, Zhou, Eisenberg, & Wang, 2013), there are also several ways in which parents could conceivably help shape adolescent temperament, or in this case, effortful control.

First, through authoritative parenting, an environment is created that fosters the development of self-control for children. Specifically, showing unconditional acceptance toward children and being dependably involved in their lives can initiate an emotional climate that is warm, secure, and stable, a relationship in which children can safely explore and process their own emotions (Morris, Silk, Steinberg, Myers, & Robinson, 2007). Grusec, Goodnow, and Kuczynski (2000) suggest that parental responsiveness, more specifically warmth, may influence children to acquire parental values, either through a desire to be like their parents or to please them. This may help improve effortful control and self-regulation with respect to antisocial behavior. In addition to this, highly involved and responsive parents can provide instrumental, practical help and emotional support to their adolescent when needed. As attachment theory suggests, being able to seek external support is a key component to the development of coping, a self-regulation ability that relates to effortful control (Skinner & Zimmer-Gembeck, 2007).

Indeed, Lengua and Kovacs (2005) reported significant within-time correlations between both maternal acceptance and maternal involvement with self-regulation abilities ( $r = .35$ ,  $p < .01$  and  $r = .21$ ,  $p < .05$ , respectively) in a community sample of 8- to 11-year old children. Their measure of self-regulation involved both attention regulation and inhibitory control.

Psychological autonomy granting gives adolescents the freedom to process and express their feelings apart from the aversive experience of psychological control, which is more typical of authoritarian parenting and commonly induces fear, guilt, or shame in the child (Barber, 2002; Baumrind, Larzelere, & Owens, 2010). Parents who show psychological autonomy granting do so by providing adolescents with age-appropriate opportunities to practice self-regulation of their own attention, inhibition, and activation of behaviors. Together, psychological autonomy granting and acceptance-involvement are generally viewed as indicators of a good parent-child relationship, or as being subsumed within the higher-order dimension of responsiveness (Henry & Hubbs-Tait, 2013). Self-regulation is more likely to occur, and adolescents are more likely to want to take on the values and behaviors modeled by those around them, when their social environment facilitates a sense of autonomy, competence, and relatedness (Grolnick & Farkas, 2002). Such a context of psychological safety is conducive to the development and strengthening of self-regulation abilities in adolescence (Grolnick & Farkas, 2002).

In contrast, adolescents who feel emotionally dismissed by laissez-faire parents or who experience constant hostility from their parents may have a plethora of stressful emotions with which to contend, which may inhibit the development of effortful control (Hoffman, 2000). For instance, Pasalich, Waschbusch, Dadds, and Hawes (2014) found

that mothers of children with callous-unempathic traits tended to show attitudes that were less accepting of emotions, and they tended to engage in emotion socialization styles that were more dismissing of their children's emotions. Also, internalizing symptoms like anxious and depressive feelings are related to authoritarian and permissive parenting styles (Gray & Steinberg, 1999), to psychological control (Pettit et al., 2001), and to the use of harsh and lax parenting tactics known as seesaw discipline (Parent, McKee, & Forehand, 2016). When anxious and depressive emotions are intense and prolonged, they are likely to impede learning of self-regulatory skills (Cole, Michel, & O'Donnell Teti, 1994). This is in line with the Yerkes-Dodson principle which states that there is an optimum level of motivation for each problem, and that the optimum level is lower when tasks are more complex (Yerkes & Dodson, 1908; White, 1959). In other words, the poor emotional climate created by low acceptance-involvement (e.g., uncertainty about whether your parent will help you when you need it) and high psychological control (e.g., feeling that your parent tries to manipulate your thoughts and feelings) increases the level of stress experienced by the child *and* prematurely requires them to handle it on their own, thereby inhibiting the normal development of self-regulation and effortful control. Previous research has also found that high psychological control is related to externalizing problems in adolescents (e.g., Pettit et al., 2001).

Second, authoritative parenting may be related to effortful control by the provision of opportunities to practice self-control. Indeed, there is empirical evidence of a link between authoritative limit setting and capacities for self-regulation such as executive control in preschool aged children (e.g., Lengua, Honorado, & Bush, 2007; Lengua et al., 2014; LeCuyer & Swanson, 2016). During adolescence, authoritative limit-



setting entails the provision of clear and reasonable boundaries for children, and enhances the moral reasoning of adolescents by delineating right and wrong. Given that an important aspect of effortful control is the ability to inhibit one's impulses, it is necessary for parents to not only have rules that prohibit certain behaviors in certain situations, but to give children a chance to practice inhibiting their impulses independent of their parents. According to self-determination theory, the psychosocial adjustment of adolescents should be greater when adolescents are permitted to behave in ways that are guided by their own motives (Smits, Soenens, Vansteenkiste, Luyckx, & Goossens, 2010). In other words, the behavioral control aspect of authoritative parenting holds the child accountable to regulate their own behavior according to parental limit setting, and thus may improve their own effortful control over time.

On the other hand, children of parents who exhibit attributes more in line with an authoritarian, permissive, or neglectful parenting style may have difficulty experiencing, understanding, expressing, and regulating their emotions and behavioral impulses due to inadequate socialization (Pasalich et al., 2014). That is, in the words of Vazsonyi and Huang (2010), "in the absence of positive socialization and (mostly) positive parenting behaviors, such as positive affect, supervision or monitoring, and discipline, children are less likely to learn to delay gratification, to be sensitive to others, and to plan for tomorrow" (p.246). Indeed, there is research to suggest that parents who are lax in monitoring, are also inconsistent in disciplining (Patterson & Fisher, 2002). Without the assurance of proper discipline (e.g., accountability, consequences), limit setting would not necessitate self-regulation; neither would parental knowledge or tracking which are

effective because they help the adolescent consider their behavior in light of their parents' morals and values.

Along these same lines, parental knowledge may involve parents allowing their adolescent the freedom and privilege to adhere to the limits that were set, and ensuring that the child abstains from inappropriate behavior. Again, self-determination theory would predict that adolescents accrue psychosocial benefits when their behavior is guided autonomously (Smits et al., 2010). For example, parents may give their adolescent children age-appropriate opportunities to practice self-regulation skills as they seek to inhibit impulses and behaviors that their parents have prohibited, and to disclose information to their parent that would be helpful for them to know, whether solicited by the parent or spontaneously provided by the adolescent (Stattin & Kerr, 2000). However, Stattin and Kerr (2000) suggest that parental solicitation (i.e., tracking) may be perceived by adolescents as intrusion into their privacy, as they found solicitation to be a positive predictor of adolescent norm-breaking behavior. Thus, it is reasonable to expect tracking to have an adverse effect on effortful control, while the likelihood of disclosure on the part of the adolescent is largely related to the role of trust in the parent-child relationship (Kerr, Stattin, & Trost, 1999) and would thus be expected to have positive effects on effortful control. In this way, parental knowledge is relevant to the dimension of responsiveness, but has traditionally been considered relevant to the dimension of behavioral control or demandingness.

For these reasons, it seems likely that the dimensions of authoritative parenting may be directly related to effortful control. Next, consideration is given to how effortful control is related to adolescent antisocial behavior.

### **Effortful Control and Antisocial Behavior**

In a Chinese sample of first and second grade children, Eisenberg, Chang, Ma, and Huang (2009) found concurrent negative correlations between externalizing problems (measured as aggression and delinquency) and effortful control (measured as attentional regulation and inhibitory control) as well as decreases in externalizing problems over time predicted by effortful control. Similarly, de Kemp et al. (2009) found that self-control consistently related to decreases in aggressive and delinquent behavior of Dutch adolescents at a 6-month follow-up. Self-control was not influenced by aggression or delinquency. More recently, Sorge, Skilling, and Toplak (2015) found that a composite of self-control (measured as impulsivity, consideration of future consequences, and having an analytic versus intuitive response style) was a significant negative predictor of antisocial behavior in a sample of 91 male adolescents, aged 11 to 19 years old.

Based on a review of more than 300 studies, DeLisi and Vaughn (2014) provide a foundation for a temperament-based theory of antisocial behavior. Of relevance to the current study, they found that effortful control was predictive of self-regulation deficits and behavioral problems across the lifespan, including during adolescence. Given that effortful control involves the ability to regulate one's emotional reactivity, effortful control should influence the behavioral inhibition system for adolescents who are at risk temperamentally. For example, effortful control should deter the adolescent whose low fear (and low guilt, and low empathy) would otherwise be related to an increased likelihood of engaging in antisocial behavior (Frick & Morris, 2004). Similarly, effortful control should inhibit the adolescent whose tendency to become easily frustrated would otherwise provoke him or her to aggression (Berkowitz, 1993; Reker, 2010). Likewise,

effortful control should help constrain the adolescent who finds pleasure in engaging in high-intensity behaviors which are sometimes risky and usually prohibited or at least ill-advised during the adolescent period (Rothbart, 2007).

But more than that, effortful control should help adolescents to resist peer pressure to engage in antisocial behaviors. Gardner, Dishion, and Connell (2008) found, in a sample of 17- to 19-year old adolescents, that effortful control moderated the association of peer deviance with later self-reported adolescent antisocial behaviors such as lying, truancy, theft, and violence, after controlling for prior levels of antisocial behavior. In a community sample of 704 early adolescents, Mrug, Madan, and Windle (2012) found that peer deviance was related to delinquent behavior over time more strongly for adolescents with low levels of task orientation, flexibility, and positive mood, compared to youth with higher levels of these self-regulative abilities.

Finally, because effortful control is a voluntary process that involves regulating attention, effortful control should also help adolescents to shift attention between short-term and longer-term outcomes, and thus resist antisocial behaviors that provide short-term pleasure but have longer-term negative consequences. From both a theoretical and empirical perspective then, it seems that among adolescents for whom abilities in effortful control are poor, antisocial behavior will be more likely to occur.

### **Indirect Link between Parenting and Antisocial Behavior through Effortful Control**

Empirical evidence supports testing the current model which hypothesizes an indirect link between parenting and antisocial behavior through effortful control. For example, Finkenauer, Engels, and Baumeister (2005) conducted a study with a large sample of boys and girls between the ages of 10 and 14 years old, in which they found

that adaptive parenting behavior (high parental acceptance, strict control and monitoring, and little use of manipulative psychological control) was directly and negatively related to behavioral problems (delinquency and aggression), and that the link was partially mediated by self-control (which was measured as self-discipline, and an ability to concentrate, and resist temptation). One limitation of their study is that it used cross-sectional data.

Chang, Olson, Sameroff, and Sexton (2011) examined whether parenting (warm responsiveness, induction, and corporal punishment) and effortful control measured in 3-year-old children predicted externalizing problems at age 6 years. They found that, for boys only, child effortful control mediated the effect of parental warm responsiveness and corporal punishment on children's externalizing behavior three years later. However, data for their exogenous and mediating variables were collected at time 1 only, and their model did not account for previous externalizing behaviors, which means they can not make conclusions about whether parenting and effortful control contributed to changes in externalizing behaviors above and beyond the effects of its stability over time.

In a similar vein, Kochanska and Kim (2014) demonstrated how the mutually-responsive orientation observed in parent-child interactions when the child was between 25 and 30 months, predicted effortful control when the child was between 33 and 38 months, and the internalization of rule-compatible conduct which was assessed between 40 and 67 months. The mutually responsive orientation as outlined by Kochanska (2002) is a parent-child relationship characterized by parental warmth, nurturance, and shared positive affect, akin to the current study's measure of acceptance-involvement. Again, a

limitation of their study was that they did not account for initial levels of effortful control or internalization of conduct rules.

Eisenberg, Zhou, Spinrad, Valiente, Fabes, and Liew (2005) conducted a three-wave longitudinal study to explore whether effortful control mediated the relation between parental positive expressivity or warmth and externalizing problems in 9- to 13-year-old adolescents. Mother-child interactions were used as a proxy for maternal parenting. They also examined whether children's effortful control predicted parenting over time. Importantly, they found that effortful control mediated the relation between parenting and externalizing problems, and there was no evidence to support the claim that children's effortful control predicted parenting. Despite the merits of this study, such as testing the directionality of effects between parenting and effortful control, a limitation is that it did not seem to evaluate whether the child's externalizing problems predicted parenting. As well, they only examined a specific dimension of parenting which did not include behavioral control.

### **Antisocial Behavior and Effortful Control Predict Parenting**

It should be noted that a large portion of the research concerning antisocial behavior considers parenting and temperament as the antecedent variables in the association. There is some research to suggest, however, that there is a bidirectional relationship between temperament and parenting, and even antisocial behavior and parenting. These findings align with the concept of evocative gene-environment correlations (Rutter, 2006), in which the adolescent's temperament, in this case, effortful control, evokes a response from parents. Likewise, the adolescent's behavior, which may be governed in part by temperament, may evoke a response from parents.

For example, Eisenberg et al. (1999) investigated parents' negative reactions to children's self-regulation. They found evidence of reciprocal effects: children's self-regulation at 6–8 years of age predicted fewer parental punitive reactions to children's emotions 2 years later; and parents' punitive reactions to children's emotions predicted poorer child self-regulation 2 years later.

With respect to adolescent behavior, Vuchinich, Bank, and Patterson (1992) found evidence for a reciprocal relationship between parental discipline and child antisocial behavior in a 2-year longitudinal study of preadolescent boys. More recently, Larsson, Viding, Rijdsdijk, and Plomin (2008) tested an auto-regressive cross-lagged model of the association between parenting and antisocial behavior in a large sample of twins during early childhood, to determine whether the association was best explained by parent-driven or child-driven effects. They found support for both effects: parental negativity at age 4 uniquely predicted antisocial behavior at age 7 and genetically influenced antisocial behavior at age 4 evoked parental feelings of negativity towards the child at age 7, independent of previous parental negativity. In a sample of high school students, Willoughby and Hamza (2011) found a reciprocal association between problem behavior (measured as delinquent activity, alcohol, smoking, marijuana, and hard drug use) and parental knowledge regarding the adolescent's free time activities. More specifically, higher parental knowledge predicted reduced problem behavior over time and higher problem behavior in turn predicted lower parental knowledge. The current study assesses an alternate model which builds on these and similar findings.

### **Contributions of the Current Study**

To date, there is an abundant amount of research involving various constructs of parenting, self-regulation, and problem behaviors. Yet, Perez-Edgar (2015) noted that the field of research concerning effortful control has been limited in scope to studying its development in early to middle childhood, leaving unexplored a developmental period in which “effortful control skills are expanded, applied to more complex and long-term goals, and subjected to new pressures that accompany the expanding experiential environment for adolescents” (p. 82). The current study extends the literature on this topic by providing a unique contribution in several ways.

First, the age range of participants in the current study is slightly older than in many other studies of effortful control (e.g., Eisenberg et al., 2005). By researching the relations between these variables in a community sample of adolescents, the current study helps fill a gap in the literature which has largely involved samples of children. Moreover, as many researchers, theorists, and parents can attest, adolescence is a developmental period marked by considerable change in social, emotional, cognitive, and behavioral domains. For example, adolescents begin orienting less to their parents and spend more time in unsupervised activities with their peers, who may be involved in antisocial behaviors themselves (Gecas & Seff, 1990; Larson, 2001; McCuaig-Edge & Craig, 2012). Cognitively, adolescents are capable of greater self-regulation than young children (Shulman et al., 2009), and they may be given more opportunities at school and in the home during this developmental period to exercise effortful control abilities. Adolescents are also able to think about their own effortful control and antisocial behavior and provide self-report measures. The current study included the adolescents’



perspectives of maternal parenting, their own abilities in effortful control, and their own antisocial behavior. Also, the prevalence of antisocial behavior rises in adolescence as late-starting offenders begin engaging in antisocial behaviors (Moffit, 1993; Barker et al., 2007), and the severity of antisocial behavior rises in adolescence as the capability to display more serious forms of antisocial behaviors develops with age (Loeber, 1990). For these reasons, studying these relations in adolescence is a greatly important contribution of this study.

Second, the current study examined not only the relational aspect of authoritative parenting (i.e., responsiveness dimension) but also the demandingness or behavioral control aspect of authoritative parenting (i.e., limit setting and tracking). In other words, the parenting measure in the current study reflects more general parenting dimensions of acceptance-involvement, psychological autonomy granting, and parental knowledge (including self-disclosure in the models based on adolescent-report of parenting), and specific parenting practices such as tracking and limit-setting. By using a more comprehensive measure of parenting than some previous studies (e.g., Eisenberg et al., 2003; 2005), the current study can examine how aspects of the parent-child relationship plus parental behavioral control uniquely and differentially contribute to adolescent adjustment (i.e., improvements in effortful control and reductions in antisocial behavior). This approach is supported by current efforts at understanding the role of parenting which involve taking a more granular look at the different facets of parenting. For example, recent exploratory factor analyses found support for a six-factor model of parenting, which included Emotional Warmth, Autonomy Support, Anxious Intrusiveness, Punitive

Discipline, Permissive Discipline, and Democratic Discipline (Reid, Roberts, Roberts, & Piek, 2015).

Third, by performing longitudinal analyses of data collected across two waves, the current study can examine the nature of these relations between two points in time, accounting for previous levels of each of the variables. In other words, significant effects are above and beyond the stability effects of the mediator and outcome variables. Also, these data allow for the testing of an alternate model in which adolescent effortful control is expected to predict changes in parenting over time, directly and indirectly through adolescent antisocial behavior. Thus, the extent to which bidirectionality applies to the current sample and data can be examined.

### **Research Questions and Hypotheses of the Present Study**

The current study's main research question explored whether maternal authoritative parenting is related to antisocial behavior over time through adolescent effortful control. Specifically, it is hypothesized that psychological autonomy granting, acceptance-involvement, knowledge, and limit setting will each be positively related to adolescent effortful control and negatively related to adolescent antisocial behavior concurrently and over time. Tracking, in line with research by Stattin and Kerr (2000) regarding parental solicitation, is expected to be negatively related to effortful control and positively related to antisocial behavior. As well, effortful control is expected to be negatively related to antisocial behavior, and to be the variable through which the authoritative parenting dimensions at wave one are indirectly related to antisocial behavior at wave two. The statistical analyses can show how parenting may have an indirect effect on antisocial behavior prospectively through effortful control holding

initial levels of effortful control and antisocial behavior constant. The current study also accounts for the possible reciprocal relations between parenting, effortful control, and antisocial behavior, by testing an alternate model of the indirect effects between effortful control and parenting through antisocial behavior. In the alternate model, it is hypothesized that effortful control at time 1 will be negatively related to antisocial behavior at time 2, which will be associated with less authoritative parenting at time 2. There are no *a priori* hypotheses regarding gender differences, or regarding the effects of specific informants (mother versus adolescent), but reports of parenting were kept separate to show whether there were differences in the results based on the informant, and gender is tested as a possible moderating variable.

## **Method**

### **Participants**

Data for Study 1 were obtained from a larger dataset ( $N = 1179$ ) that was collected for a research initiative which focused on youth gambling and related risk factors (Dane, McPhee, Root, & Derevensky, 2004). While the age of participants ranged from 9 to 21 years old in the original study, analyses for the proposed study will be based on a community sample of adolescents ( $N = 521$ , 55% female) ranging in age from 10 to 15 years old ( $M_{age} = 12.95$  years,  $SD = 1.60$ ) at the time of the first survey completion, and between the ages of 11 and 17 at time 2. Most adolescent participants (95%) lived with their mother; 73% lived with both parents at the time of the first assessment, and 22% lived with their mother in some other type of family arrangement (mother only, mother and step-father, mother and partner). Because of the preponderance of children

living with their mothers, and because of the near complete data collected from mothers (97%), the data collected from mothers but not fathers were included in this study.

Many of the mother participants (77%) indicated their families were Canadian in ethnicity and culture, and 23% indicated their families belonged to a different ethnicity or culture. Of those who specified the ethnicity or culture with which they identified, the most common responses were citizens of the United States (2.2%) and identification with various European countries (14.9%). Very few indicated Asian (1.2%), Aboriginal (0.6%), and African (0.2%) descent. The modal response (accounting for approximately 15% of families) for household income before taxes in the previous year was reported by mothers to be \$50,000-\$60,000; 30% fell below this income level, and 55% were above this income level.

### **Procedure**

Adolescent participants and their parents responded to questionnaires at two times with a span of approximately 18 months between assessments. Participants were recruited from the community through random digit dialing, and questionnaire packages were mailed to participants and mailed back to investigators. Participants received \$20 for their participation. Data from mother and adolescent reports were sometimes kept as separate variables for analyses because of differences in perspectives (e.g., parenting), but were combined where indicated by theory or the data (e.g., effortful control).

### **Missing Data**

Of the sample for the current study, limited to those participants who were between the ages of 10 and 15 years old at wave 1 ( $N = 521$ ), there were 254 adolescents who also participated at wave 2. In other words, there were 49% who provided data at

both waves, and 51% who provided data at wave 1 only. The analyses for the current study operate under the assumption that there are no systematic differences between those who continued and those who discontinued. However, given the large proportion of cases lost as a result of attrition, and in light of the fact that attrition in other longitudinal research concerning antisocial behavior (e.g., Foster & Fang, 2004) tends to be related to higher scores of antisocial behavior, the extent to which this missingness mechanism may introduce bias to the estimates of the current study's path analyses was explored. Essentially, those who completed both waves may represent a participation bias, and those who discontinued may represent an attrition bias.

Little's MCAR test was used to evaluate the assumption that data were missing completely at random (MCAR). The test included gender as a categorical variable (i.e., male or female), parenting dimensions, effortful control, and antisocial behavior at waves 1 and 2, and age as continuous variables. The chi square result was nonsignificant, which meant failure to reject the null hypothesis, thereby suggesting that data were not missing for systematic reasons.

To follow up this test, the less restrictive assumption of missing at random (MAR) was assessed. An independent samples *t*-test was used to compare the means of wave 1 parenting, effortful control, and antisocial behavior of those participants from wave 1 ( $N = 521$ ) who continued in the study ( $n = 254$ ) to those who discontinued ( $n = 267$ ). There were no significant differences found between the two groups for psychological autonomy granting, acceptance-involvement, knowledge, tracking, or limit setting. As well, there were no significant differences found between those who continued and those who discontinued for effortful control or antisocial behavior. These results suggest that

there is no relationship between the missingness of the data and the data. A common method for handling missing data, expectation-maximization, was used to allow for the use of the bootstrapping method in testing indirect effects.

## **Measures**

The study's measures are described below. Refer to Table 2.1 for additional information concerning descriptive statistics and the inter-rater correlations for parenting.

**Demographic information.** Adolescents reported information at Time 1 regarding their *age* in years (which was included in the analyses as a covariate), their *gender* whether male or female, and who they lived with the most (e.g., mother and father, etc.). Parents also reported their own and their children's demographic information including household income, but those data are not used in the current study because income was not related to the other variables in a way that required it to be used as a covariate.

**Authoritative parenting.** Authoritative parenting dimensions were rated by adolescents and mothers at both waves using the Authoritative Parenting measure (Gray & Steinberg, 1999) which includes three subscales, psychological autonomy granting, acceptance-involvement, and behavioral supervision and strictness (also referred to as monitoring knowledge). The parent version included the same subscales and similar items as the adolescent version but it was worded to reflect how mothers perceived their own parenting behaviors. A scale measuring self-disclosure (Stattin & Kerr, 2000) was also included in the questionnaire package for youth but not their mothers.

***Psychological autonomy granting.*** The psychological autonomy granting subscale measures the extent to which adolescents perceive that their mothers employ

non-coercive, democratic discipline and encourage the adolescent to express individuality within the family. A sample item is “She lets me make my own plans for things I want to do.” Adolescents indicate on a 4-point scale the extent to which they agree with the items, where 1 = strongly disagree, 2 = disagree somewhat, 3 = agree somewhat, and 4 = strongly agree. The other items that comprise this subscale were reverse coded so that high scores reflect high levels of psychological autonomy granting. Internal consistency for this 9-item subscale based on adolescent report was good (Time 1  $\alpha = .72$ , Time 2  $\alpha = .73$ ), and based on mother report, the alpha coefficients for time 1 and 2 were .68 and .67 respectively.

***Acceptance-involvement.*** For the adolescent version, the acceptance-involvement subscale measures the extent to which adolescents perceive their mothers as loving, responsive, and involved. A sample item is “She helps me with my schoolwork if there is something I don’t understand” to which adolescents could indicate that they (1) strongly disagree, (2) disagree somewhat, (3) agree somewhat, or (4) strongly agree. There are 9 items in this subscale, and the internal consistency was good based on adolescent-reported parenting (Time 1  $\alpha = .80$ , Time 2  $\alpha = .79$ ). Reliability for mother-reported acceptance-involvement was .64 at time 1 and time 2.

***Monitoring knowledge.*** The supervision and strictness subscale measures the extent to which adolescents perceive their mothers as being knowledgeable about how they spend their time outside of school and with peers, and the extent to which mothers try to know about how their children spend their time outside of school and with peers. It also involves parental limit setting in the form of curfew.

*Knowledge.* A sample item measuring parental knowledge is “How much does your mother really know what you do with your free time?” Respondents could indicate that (1) she never knows, (2) she sometimes knows, (3) she usually knows, or (4) she always knows. Internal consistency of this subscale was good at time 1 ( $\alpha = .83$ ) and time 2 ( $\alpha = .80$ ) for adolescents, and for mother-reported knowledge (Time 1  $\alpha = .79$ , Time 2  $\alpha = .80$ ).

For adolescent-reported parenting, self-disclosure was included with parental knowledge because factor analyses indicated that they should be combined. The self-disclosure scale (Stattin & Kerr, 2000) included five items concerning the extent to which adolescents spontaneously tell their parents about their friends, keep secrets or hide from their parents what they do during free time, evenings, and weekends, and how much they want to tell or like to tell their parents about school and their unsupervised activities. Only adolescents, and not mothers, were given these items. Responses were given on a five-point scale ranging from “almost never” to “very often.” Self-disclosure had good reliability as well (Time 1  $\alpha = .79$ , Time 2  $\alpha = .82$ ), and when combined with knowledge, reliability was .84 at time 1 and .87 at time 2.

*Tracking.* There were also three items to assess parental tracking such as “How much does she try to know?” which is more reflective of parental monitoring behaviors such as solicitation or surveillance. Internal consistency of this subscale was good based on adolescent (Time 1  $\alpha = .84$ , Time 2  $\alpha = .78$ ) and mother (Time 1  $\alpha = .83$ , Time 2  $\alpha = .70$ ) reports.

*Limit setting.* Adolescents and mothers were asked how late they could stay out on weekends and weeknights as a measure of parental limit setting. Earlier curfews were



indicative of more limit setting, and later curfews reflected less limit setting. Based on adolescent report of two items, reliability for the first wave was .78 and .84 for the second wave, and based on mother report, reliability was .79 and .81 for waves 1 and 2 respectively.

**Effortful control.** At waves one and two, adolescents responded to the Early Adolescent Temperament Questionnaire – Revised (EATQ-R; Ellis & Rothbart, 2001) which includes fourteen items that comprise the Effortful Control subscale. For each item, adolescents reported how true the statement was of themselves, indicating (1) “almost always untrue”, (2) “usually untrue”, (3) sometimes true, sometimes untrue”, (4) “usually true”, or (5) “almost always true”. The effortful control subscale reflects Inhibitory Control (e.g., “It’s easy to stop when someone tells me”), Activation Control (e.g., “If I have a hard assignment to do, I get started right away”), and Attention Control (e.g., “I pay close attention when someone tells me how to do something”). The measure had a high level of internal consistency ( $\alpha = .80$  and .81 at Time 1 and 2, respectively).

Mothers reported their child’s effortful control by responding to the Early Adolescent Temperament Questionnaire – Parent Report. For each of eighteen items, they indicated how true the statement was of their adolescent child on a Likert scale. Nine items were reverse coded so that high scores reflected greater effortful control abilities. For mother-reported effortful control, time 1 reliability was .67 and time 2 reliability was .90. The composite scale had reliability .82 at time 1 and .91 at time 2.

**Adolescent antisocial behavior.** The Self-Reported Delinquency Questionnaire (SRDQ; Le Blanc & Fréchette, 1989) was used to measure the frequency with which adolescents were involved in antisocial behavior based on their own report. The original

measure includes 27 items, three of which comprise a substance use subscale, however, those items were not included in the current study. This was to ensure that youth of all ages in the current sample could participate in the antisocial behavior being measured, because there may be more barriers for a young person to obtain alcohol and drugs than for him or her to engage in aggression, stealing, or damaging property. Also, five items from the violence and vandalism subscales were dropped to shorten the scale and to reduce the length of the overall survey. The correlation between the original and modified version was .99, and internal consistency of the modified version was good. At time 1 the overall scale reliability was .80 and at time 2 its reliability was .92. Thus, in the current study, the SRDQ included three subscales, violence, theft, and vandalism, which contained nineteen items that tap antisocial behaviors of differing kinds and degrees of severity. It is important to note that scores from this measure are not meant to reflect overall seriousness or variety.

The Violence subscale is comprised of seven items that indicate how often adolescents participated in overt (i.e., aggressive, confrontational) forms of antisocial behavior in the past year. A sample item from the Violence subscale is “In the past year, how often have you used a weapon (stick, knife, gun, rocks) in fighting with someone else?” The Theft and Vandalism subscales, comprised of eight and four items respectively, indicate how often adolescents participated in covert (i.e., non-aggressive, concealed) forms of antisocial behavior in the past year. A sample question from the Theft subscale is “In the past year, how often have you taken and kept something from a store without paying?” A sample question from the Vandalism subscale is “In the past year, how often have you purposely broken or destroyed something belonging to your

parents or another family member?” Adolescents could indicate (1) never, (2) once or twice, (3) several times, or (4) quite often. Because the distribution of the antisocial behavior variable was highly skewed and kurtotic, a transformation of the data was applied to improve the normality of its distribution.

**Table 2.1***Means and Standard Deviations of Study Variables and Inter-rater Correlations*

<b>Variable</b>	<b>Mother</b>		<b>Adolescent</b>		<b><i>r</i></b>
	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>M</i></b>	<b><i>SD</i></b>	
Gender (female)			55%		
Age (years)			12.95	1.60	
Psychological Autonomy Granting-1	3.00	.41	2.79	.53	.40**
Psychological Autonomy Granting-2	3.06	.39	2.83	.53	.41**
Acceptance-Involvement-1	3.66	.28	3.40	.47	.30**
Acceptance-Involvement-2	3.63	.27	3.31	.47	.41**
Knowledge-1	3.78	.37	3.30	.56	.28**
Knowledge-2	3.69	.40	3.38	.62	.42**
Tracking-1	3.80	.50	2.95	.99	.20**
Tracking-2	3.80	.39	3.08	.85	.18**
Limit Setting-1	4.56	1.12	4.28	1.32	.67**
Limit Setting-2	3.87	1.17	3.57	1.35	.84**
Effortful Control-1 (combined)			3.52	.54	
Effortful Control-2 (combined)			3.54	.51	
Antisocial Behavior-1	-	-	1.14	.21	
Antisocial Behavior-2	-	-	1.20	.31	

*Note.* Means, standard deviations, and correlations were calculated using SPSS 22. Numbers 1 and 2 refer to assessments at times 1 and 2. Parenting scale ranged from 1-4 but limit-setting subscale ranged from 1-7. Adolescent report of knowledge included self-disclosure. Temperament (effortful control) scale ranged from 1-5 and is the combined (averaged) score of mother and adolescent report. Antisocial behavior scale ranged from 1-4 and used adolescent reports. \*\*  $p < .01$

## Plan of Analyses

All statistical analyses were performed using SPSS Statistics 22 and SPSS Amos 22. The mean variables were computed for the parenting dimensions, effortful control composites, and self-reported adolescent antisocial behavior scores for which there were at least 50% of the data present in any given variable by summing and averaging the values provided. Global fit indices were used to evaluate the goodness-of-fit for each model. Specifically, root mean square error of approximation (RMSEA) and the comparative fit index (CFI) were reviewed. Taken together, a RMSEA value less than .06 and a CFI value greater than .95 were considered to suggest good model fit (Hu & Bentler, 1999).

**Parent-led model.** To test whether effortful control is an intervening variable in the relation between parenting and antisocial behavior, a series of path analyses were conducted in which Time 1 correlations between study variables and autoregressive paths of effortful control and antisocial behavior were estimated (Bollen & Curran, 2006). The direct relations between each of the five parenting dimensions (psychological autonomy granting, acceptance-involvement, knowledge, tracking, and limit setting) at Time 1 with effortful control and antisocial behavior at Time 2 were estimated simultaneously. The indirect path from the parenting variables at time 1 to antisocial behavior at time 2 through effortful control at time 2 was also analyzed. These analyses were conducted separately for mother and adolescent reports of parenting. While there are no theoretical reasons to believe that temperament or parenting should affect antisocial behavior differently for boys than girls, yet because of the possibility of gender differences, analyses were performed for an unconstrained model (in which paths were allowed to be

estimated freely) and a constrained model in which the paths for boys and girls were constrained to be equal, so that the possibility that gender moderated the results could be examined. These types of analyses can show the extent to which parenting predicts changes in adolescent effortful control and antisocial behavior and possible indirect effects, by accounting for stability effects of the mediator and outcome variables.

**Adolescent-led model.** There are also reasons to expect that temperament and antisocial behavior influence parenting. Thus, in addition to analyses of the hypothesized model, an alternate model testing the possibility of an indirect effect between effortful control and parenting through antisocial behavior was conducted. In all the path diagrams, the within-time correlations for the exogenous variables and the error terms for the endogenous variables were assumed to covary. Also, age is included in the models as a covariate with double-headed arrows drawn between age and time 1 study variables, and a single-headed arrow drawn to antisocial behavior at time 2 (in the current sample, age is positively related to antisocial behavior, but it is not related to effortful control).

## Results

### Preliminary Analyses

**Assumptions.** The assumption of normality and the possibility of outlying values were assessed by examining the appropriate skewness and kurtosis statistics, standardized scores, and histograms for each variable. The variable of adolescent antisocial behavior at times 1 and 2 ( $n = 521$ ) was not normally distributed. Instead, it was positively skewed (Time 1 skewness = 2.20, Time 2 skewness = 4.25) and leptokurtic (Time 1 kurtosis = 6.25, Time 2 kurtosis = 29.83) with most of the values falling on the left side of the distribution (Time 1  $M = 1.14$ ,  $SD = 0.21$ , range = 1-2.47; Time 2  $M = 1.20$ ,  $SD = 0.31$ ,

range = 1-4, where a score of 1 indicates “never”). In other words, most of the adolescents reported that they had not engaged in any of the antisocial behaviors in the past year. Given that these data were collected from a community sample as opposed to a clinical sample, this type of distribution is unsurprising. As well, there were 5 cases at Time 1 and 7 cases at Time 2 identified as outliers as they fell more than 3.29 standard deviations from the mean based on the  $z$  distribution (Tabachnick & Fidell, 2007). A natural logarithm transformation was applied to improve the normality of the distribution. After the transformation, levels of skewness (1.64) and kurtosis (2.61) were within an acceptable range based on cutoff scores of 2 and 7 for skewness and kurtosis values, respectively (West, Finch, & Curran, 1995), and the distribution for time one antisocial behavior appeared more normal ( $M = 0.12$ ,  $SD = 0.16$ ). At time 2, skewness (2.17) and kurtosis were close to acceptable limits (7.26), the mean was 0.16 and the standard deviation was 0.20.

Parenting, effortful control, and antisocial behavior are generally correlated. The zero-order correlations between the key study variables are shown in Tables 2.2 and 2.3. With some exceptions for tracking and limit setting, all the parenting variables were positively related to effortful control and negatively related to antisocial behavior, and effortful control was negatively related to antisocial behavior. Knowledge was the parenting dimension that was most strongly correlated with effortful control and antisocial behavior. Of the parenting variables, knowledge and acceptance-involvement were the most strongly correlated. Because of these correlations, in estimating the path diagrams, the within-time correlations for the exogenous variables and the error terms for the endogenous variables were assumed to covary.

**Table 2.2***Correlations among Key Study Variables across the Two Waves of the Study – Adolescent-Reported Parenting*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. PAG-1	---															
2. PAG-2	.64**	---														
3. AI-1	.24**	.24**	---													
4. AI-2	.25**	.34**	.70**	---												
5. Know-1	.25**	.10*	.56**	.40**	---											
6. Know-2	.15**	.18**	.50**	.60**	.61**	---										
7. Track-1	-.02	-.03	.29**	.27**	.25**	.18**	---									
8. Track-2	.04	-.01	.25**	.29**	.26**	.39**	.51**	---								
9. LS-1	.07	-.06	.21**	.12**	.28**	.25**	.01	.07	---							
10. LS-2	.07	.00	.27**	.29**	.32**	.34**	-.00	.08	.74**	---						
11. EC-1	.24**	.21**	.22**	.17**	.36**	.29**	.07	.23**	.11*	-.01	---					
12. EC-2	.17**	.21**	.23**	.25**	.35**	.40**	.02	.19**	.09	.07	.88**	---				
13. AB-1	-.19**	-.11*	-.24**	-.20**	-.48**	-.42**	-.05	-.16**	-.28**	-.20**	-.34**	-.35**	---			
14. AB-2	-.14**	-.13**	-.26**	-.28**	-.46**	-.54**	-.07	-.21**	-.35**	-.30**	-.37**	-.42**	.65**	---		
15. Age	-.12**	-.06	-.17**	-.20**	-.21**	-.22**	.10*	.08	-.55**	-.70**	.02	-.10*	.24**	.22**	---	
16. Gender	.01	.08	-.04	-.01	.16**	.15**	.08	.09*	.07	.03	.16**	.15**	-.19**	-.13**	-.04	---

*Note.* Correlations were calculated using SPSS Statistics 22. PAG refers to psychological autonomy granting. AI refers to acceptance-involvement. Know refers to parental knowledge. Track refers to tracking. LS refers to limit setting. EC refers to effortful control. AB refers to antisocial behavior. 1 and 2 refers to times 1 and 2 of measurement. \*\*= $p < .01$ , \*= $p < .05$ .



**Table 2.3***Correlations among Key Study Variables across the Two Waves of the Study – Mother-Reported Parenting*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. PAG-1	---															
2. PAG-2	.77**	---														
3. AI-1	.10*	-.01	---													
4. AI-2	.08	.03	.63**	---												
5. Know-1	.13**	.07	.30**	.41**	---											
6. Know-2	.13**	.14**	.35**	.54**	.62**	---										
7. Track-1	-.11**	-.13**	.15**	.16**	.30**	.02	---									
8. Track-2	-.11*	-.08	.16**	.31**	.27**	.45**	.23**	---								
9. LS-1	.07	.09*	.05	.09	.17**	.34**	-.12**	.19**	---							
10. LS-2	.03	.06	.12**	.23**	.35**	.46**	.01	.25**	.74**	---						
11. EC-1	.28**	.31**	.21**	.12**	.26**	.34**	.10*	.07	.04	.00	---					
12. EC-2	.21**	.24**	.30**	.27**	.35**	.43**	.13**	.09*	.04	.07	.88**	---				
13. AB-1	-.11*	-.07	-.17**	-.15**	-.27**	-.39**	.01	-.10*	-.26**	-.25**	-.34**	-.35**	---			
14. AB-2	-.10*	-.05	-.11*	-.20**	-.28**	-.40**	.03	-.09*	-.25**	-.28**	-.37**	-.42**	.65**	---		
15. Age	-.04	-.10*	-.04	-.15**	-.16**	-.39**	.10*	-.16**	-.59**	-.74**	.02	-.10*	.24**	.22**	---	
16. Gender	.01	.11*	-.02	.05	.12**	.12**	.11*	.08	.04	.03	.16**	.15**	-.19**	-.13**	-.04	---

*Note.* Correlations were calculated using SPSS Statistics 22. PAG refers to psychological autonomy granting. AI refers to acceptance-involvement. Know refers to parental knowledge. Track refers to tracking. LS refers to limit setting. EC refers to effortful control. AB refers to antisocial behavior. 1 and 2 refers to times 1 and 2. \*\*= $p < .01$ , \*= $p < .05$ .

**Differentiated and composite variables.** Exploratory factor analyses were conducted in SPSS version 22 using the psychological autonomy granting, acceptance-involvement, knowledge, tracking, and limit setting items based on wave 1 adolescent report. The unforced solution extracted five components which corresponded to psychological autonomy granting, acceptance-involvement, knowledge, tracking, and limit setting, and explained 64% of the variance, the largest percentage explained compared to other forced solutions. When the self-disclosure items were added, a five-factor solution accounted for 50% of the variance, in which acceptance-involvement loaded on Factor 1, knowledge and self-disclosure loaded on Factor 2, psychological autonomy granting loaded on Factor 3, tracking loaded on Factor 4, and limit setting loaded on Factor 5. A similar pattern of factors emerged using the mother-reported parenting items from wave 1. Thus, it was decided to analyse separate paths for the parenting variables but to combine parental knowledge (3 items) and adolescent self-disclosure (5 items) into a composite variable in the path analyses based on adolescent-reported parenting. The variable was computed by averaging together the two means.

**Multiple perspectives on parenting and temperament.** While the mother and adolescent reports of parenting at Time 1 were significantly correlated ( $ps < .001$ ), the strength of the correlations was relatively low for tracking, knowledge, and acceptance-involvement ( $rs = .20, .28$ , and  $.30$ , respectively). The correlations for psychological autonomy granting and limit-setting were higher ( $.40$  and  $.67$ , respectively). But on theoretical grounds, keeping parenting variables separate for each informant may be important to show how the child's perspective of parenting relates to their behavior. Also, Padilla-Walker et al. (2012) found that results varied as a function of the reporter. Thus,

separate variables were created for mother and adolescent reports of maternal parenting for each of these dimensions, to observe similarities and differences in the results as a function of the informants' unique perspectives.

Even though some researchers conduct separate analyses based on parent and adolescent reports of temperament (e.g., Ellis, Rothbart, & Posner, 2004; Robins, Donnellan, Widaman, & Conger, 2010), there are examples of studies in which scores have been combined (e.g., Davenport, Yap, Simmons, Sheeber, & Allen, 2011) and recommendations made to avoid considering mothers' and adolescents' views separately (e.g., Burk & Laursen, 2010; Laursen, 2005). With the present data, tests of the zero-order correlations between mother- and child-reports of effortful control revealed that there were significant, positive correlations between their reports ( $r = .56$  and  $.68$ ,  $p < .01$  at Time 1 and 2, respectively). Additionally, the internal consistency of the combined items at the two waves was high ( $\alpha = .82$  and  $.91$ ). Finally, a measurement model of effortful control conducted in Amos with mother and adolescent reports as indicators found that the model fit the data closely,  $\chi^2(2) = .230$ ,  $p = .891$ ; CFI = 1.000; RMSEA = .000, 90% CI [.000 - .032], and the range of beta values (factor loadings) was .73 to .77. Thus, the mother and adolescent reports of effortful control were used to create composite effortful control variables for each time of measurement.

**Gender differences.** At the first wave, male participants reported, on average, greater frequency of involvement in antisocial behavior ( $M = .15$ ,  $SD = .17$ ) than female participants ( $M = .09$ ,  $SD = .15$ ), and the difference was statistically significant ( $t(517) = 4.32$ ,  $p < .001$ ). At the second wave, male participants reported greater frequency of involvement in antisocial behavior ( $M = .18$ ,  $SD = .21$ ) than female participants ( $M = .14$ ,

$SD = .19$ ), but the difference was nonsignificant ( $t(251) = 1.87, p = .063$ ). Despite these differences in mean levels of antisocial behavior for boys and girls, no predictions were made about differences in the relations between the study variables based on gender. At least some portion of the girls and some portion of the boys reported engaging in each of the antisocial behaviors described in the SRDQ (see Table 2.4). Nonetheless, gender was used as a grouping variable for multi-group analyses in AMOS (in which an unconstrained model was compared to a model with paths constrained to be equal for boys and girls) to examine whether results significantly differed as a function of adolescent gender. Chi-square difference tests compared the two models to see whether gender moderated the results (if the null hypothesis was not rejected, the two models fit the data equally well and the results were not significantly different between boys and girls).

**Table 2.4***Proportion of Boys (n = 233) and Proportion of Girls (n = 288) who Endorsed Each Item on the SRDQ*

<b>Item</b>	<b>Subscale</b>	<b>% of boys</b>	<b>% of girls</b>
1. Purposely broken or destroyed musical instruments, sports equipment or other school equipment	Vandalism	8.3	4.8
2. Taken and kept any school property worth \$10 or more	Theft	8.4	5.4
3. Taken and kept something from a store without paying	Theft	7.4	6.5
4. Threatened to hit someone or to force them to do something they didn't want to do	Violence	26.3	18.2
5. Taken part in fights between groups of youth (gangs)	Violence	16.2	10.6
6. Purposely broken or destroyed something that didn't belong to you	Vandalism	18.1	13.4
7. Taken and kept something worth less than \$10, that didn't belong to you	Theft	17.5	11.6
8. Bought or sold something you knew was stolen	Theft	4.8	1.3
9. Entered a place where you were not allowed	Theft	35.9	19.2
10. Taken and kept something worth between \$10 and \$100 that didn't belong to you	Theft	4.9	4.5
11. Gone without paying to a place where you should have paid (movie theater, concert, sports event)	Theft	17.7	11.3
12. Used a weapon (stick, knife, gun, rocks) in fighting with someone else	Violence	5.7	3.4
13. Purposely broken or destroyed something belonging to your parents or another family member	Vandalism	11.9	9.9
14. Taken money from the house without permission, or without the intent of saying anything	Theft	15.4	15.1
15. Carried a weapon (chain, knife, gun, etc.)	Violence	17.2	2.0
16. Started a fire in a store or elsewhere	Vandalism	4.0	1.0
17. Thrown rocks, bottles, or other objects at someone	Violence	19.3	8.5
18. Hit someone who hadn't done anything	Violence	13.7	8.6
19. Had a fist fight with anyone	Violence	38.8	13.4

## Main Analyses

This section reports the results of four path analyses. The first two examine the hypothesized model, and the second two test the alternate model. In each case, with respect to the parenting dimensions, results are given based on adolescent report first, and the results based on mother report are given second. A figure depicting each model is presented to show the significant auto-regressive and cross-lagged paths (see Figures 2.1 to 2.4). A summary table showing all the contemporaneous and lag-1 paths, both significant and nonsignificant, from the two informants is also provided (see Tables 2.5 and 2.6).

**Hypothesized model using adolescent report of parenting.** Figure 2.1 shows the specified path diagram including significant autoregressive and cross-lagged paths, and squared multiple correlations. This model examined the direct effects of Time 1 parenting on Time 2 effortful control and Time 2 antisocial behavior as well as the indirect effects of Time 1 parenting on Time 2 antisocial behavior through Time 2 effortful control. The autoregressive coefficients of effortful control and antisocial behavior were estimated, age was allowed to covary with the Time 1 variables, and a path was estimated between age and Time 2 antisocial behavior. Indices of model fit suggested good fit of the model to the data (CFI = .998; RMSEA = .056, 90% CI [.027 - .089]).

Standardized coefficients for all estimated paths are shown according to the two informants in Table 2.5. The covariate age did not predict antisocial behavior over time. The stability of effortful control was high ( $\beta = .874, p < .001$ ), and the stability of antisocial behavior was moderate ( $\beta = .483, p < .001$ ). Contrary to hypotheses,

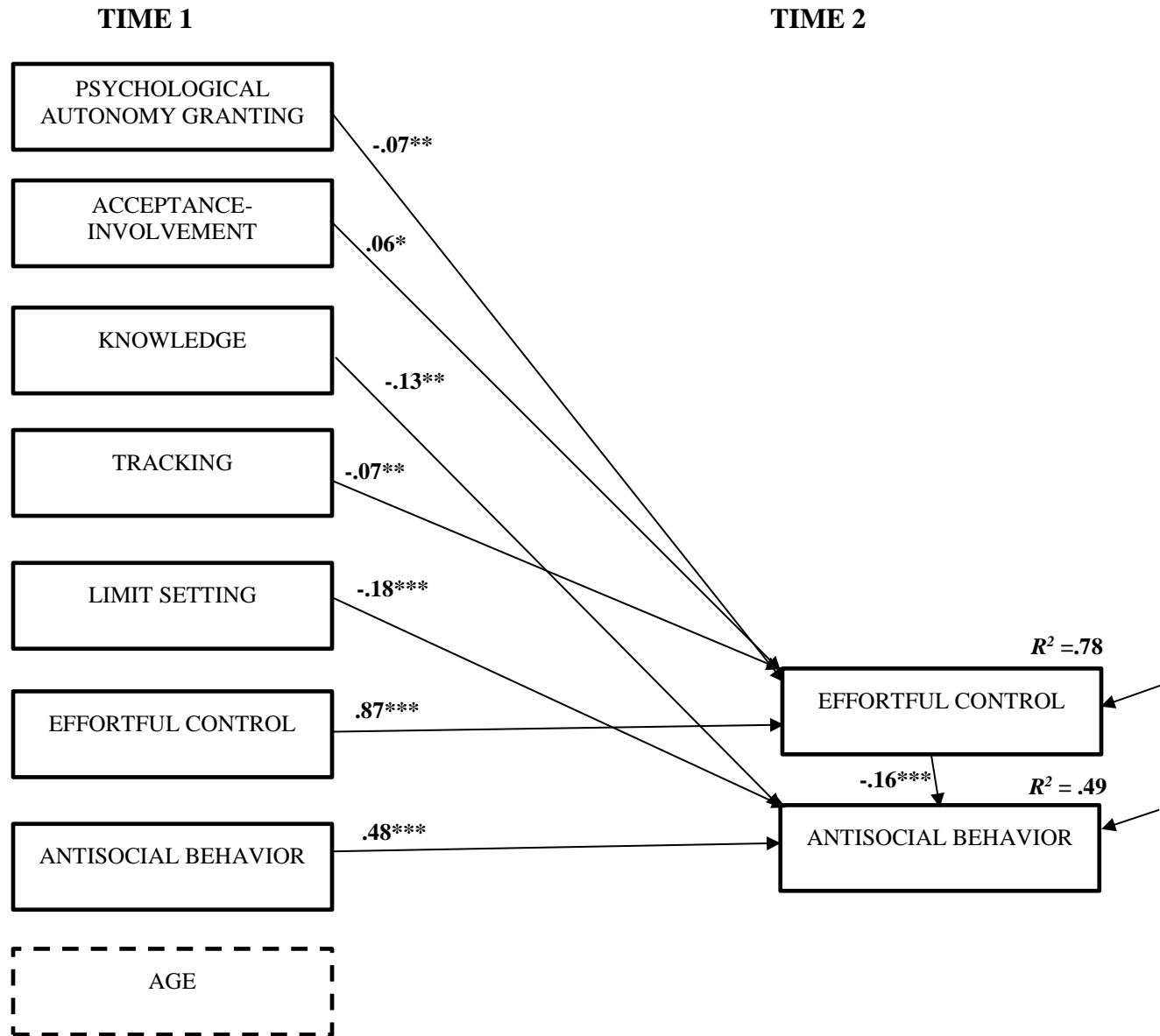
psychological autonomy granting did not predict effortful control in the expected direction; the relation was negative ( $\beta = -.065, p < .01$ ), and it did not directly predict antisocial behavior over time. Acceptance-involvement predicted effortful control in the expected direction ( $\beta = .063, p < .05$ ), but it did not predict antisocial behavior. Parental knowledge did not predict effortful control, although it predicted antisocial behavior directly as expected ( $\beta = -.131, p < .01$ ). Tracking predicted effortful control negatively ( $\beta = -.069, p < .01$ ) and did not predict antisocial behavior. Limit setting did not predict effortful control, but it did predict antisocial behavior directly as expected ( $\beta = -.184, p < .001$ ). The effect of Time 2 effortful control on Time 2 antisocial behavior was significant and in the hypothesized direction ( $\beta = -.162, p < .001$ ).

Indirect effects were found for three of the parenting dimensions. A significant indirect effect was found for psychological autonomy granting and antisocial behavior through effortful control ( $\beta = .010, p < .01$ ). In other words, Time 1 psychological autonomy granting was related to less Time 2 effortful control, which was related to higher levels of Time 2 antisocial behavior. A significant indirect effect was found for acceptance-involvement through effortful control ( $\beta = -.010, p < .05$ ), in which Time 1 acceptance-involvement was related to more Time 2 effortful control which was related to less Time 2 antisocial behavior. Also, there was a significant indirect relation between tracking and antisocial behavior through effortful control ( $\beta = .011, p < .01$ ), in that Time 1 tracking was related to less Time 2 effortful control, which was related to more Time 2 antisocial behavior. Indirect effects for knowledge and limit setting were non-significant.

**Gender as a moderator.** It was examined whether the pattern of effects differed as a function of adolescent gender. There was no significant difference in model fit

between the male and female groups,  $\chi^2_{\text{diff}}(28) = 22.83, p > .05$ , indicating that the pattern of associations between time 1 and time 2 variables was not different between genders. Therefore, gender did not seem to moderate the pattern of effects among authoritative parenting, effortful control, and antisocial behavior.





**Figure 2.1.** Diagram of significant paths and squared correlations for hypothesized model based on adolescent-reported parenting

*Note.* Values indicate standardized beta weights. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . The covariate is indicated by a dashed rectangle, and was allowed to covary with the time 1 variables (double-headed arrows not pictured here), and a single-headed arrow was drawn to time 2 Antisocial Behavior but the path was non-significant. Error terms at time 2 were allowed to covary (double-headed arrow not pictured here).

**Hypothesized model using mother report of parenting.** This analysis investigates the direct association between the five parenting variables based on mother report and antisocial behavior based on adolescent report, as well as the indirect effects involving effortful control using the combined mother and adolescent reports. Autoregressive paths for effortful control and antisocial behavior are included in this model to account for initial levels of each of the variables, and all stability effects were significant (see Figure 2.2). The covariate, age, was positively related to antisocial behavior and tracking at time 1, and negatively related to limit setting and knowledge at time 1. In this model, the fit indices suggested good model fit (CFI = .999; RMSEA = .025, 90% CI [.000 - .063]).

Many of the time 1 variables were significantly correlated. All the parenting variables except for tracking were negatively correlated with antisocial behavior, and all the parenting variables except for limit setting were positively correlated with effortful control. Effortful control was negatively correlated with antisocial behavior ( $r = -.342$ ,  $SE = .004$ ,  $p < .001$ ).

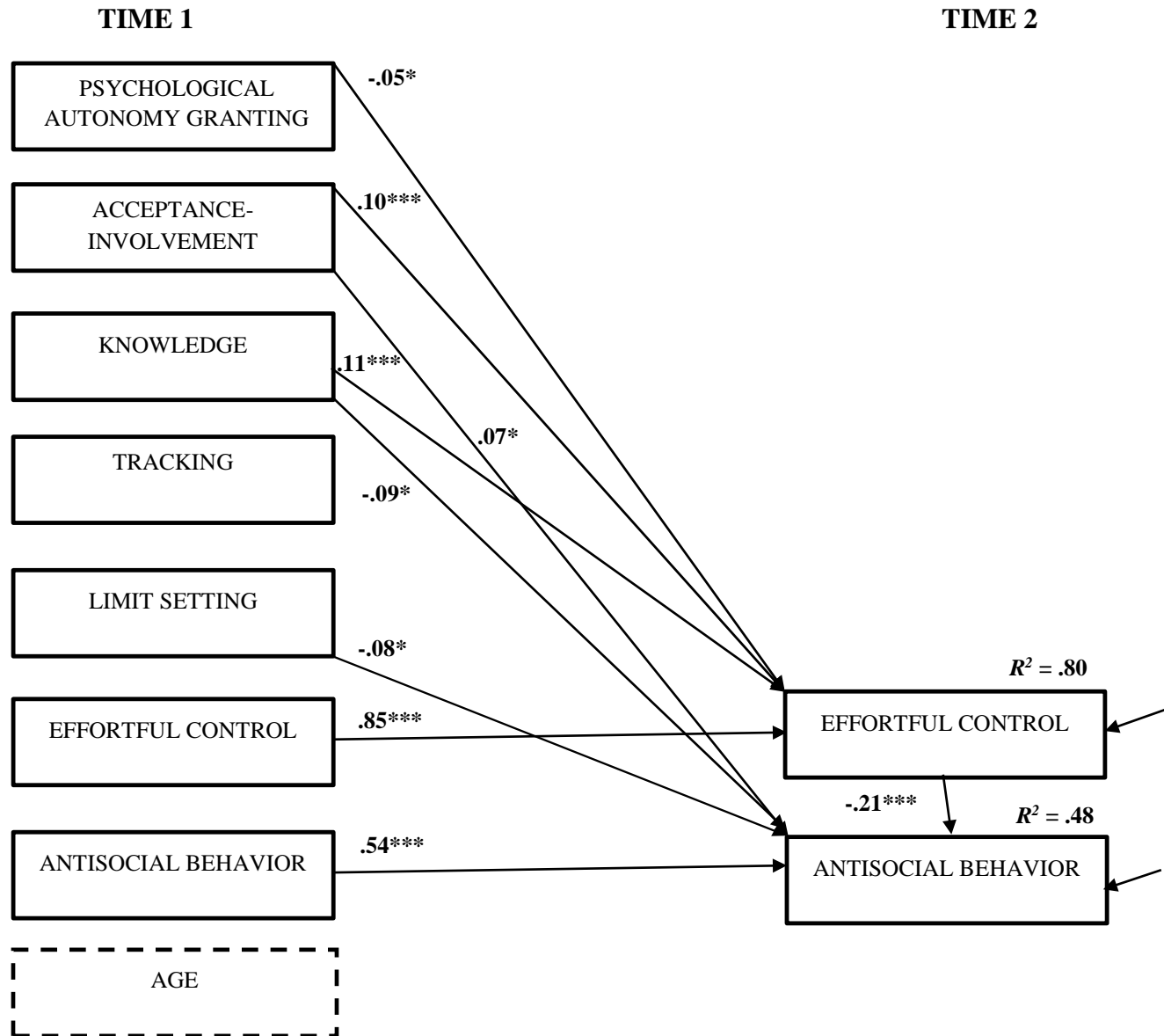
In terms of hypothesized cross-lagged paths, Time 1 limit setting and Time 1 knowledge were both related to less Time 2 antisocial behavior ( $\beta = -.080$ ,  $p < .05$ ;  $\beta = -.087$ ,  $p < .05$ ), but Time 1 acceptance-involvement was related to more Time 2 antisocial behavior ( $\beta = .068$ ,  $p < .05$ ). Time 1 psychological autonomy granting and Time 1 tracking did not significantly predict Time 2 antisocial behavior. Tracking and limit setting at time 1 did not predict effortful control at time 2. However, Time 1 acceptance-involvement and Time 1 knowledge were both positively related to Time 2 effortful control ( $\beta = .095$ ,  $p < .001$ ;  $\beta = .111$ ,  $p < .001$ ). Time 1 psychological autonomy granting

was negatively related to Time 2 effortful control, while accounting for age, and initial levels of effortful control ( $\beta = -.053, p < .05$ ).

As predicted, effortful control at time 2 significantly predicted antisocial behavior at time 2 ( $\beta = -.212, SE = .013, p < .001$ ), while accounting for the stability path of antisocial behavior.

With respect to predicted indirect effects, knowledge and acceptance-involvement had a significant, negative, indirect relation with antisocial behavior through effortful control ( $\beta = -.024, p < .01; \beta = -.020, p < .01$ ). In other words, Time 1 parental knowledge and Time 1 acceptance-involvement were each related to more Time 2 adolescent effortful control which was related to lower levels of Time 2 antisocial behavior. There was a significant, indirect effect of Time 1 psychological autonomy granting on Time 2 antisocial behavior through Time 2 effortful control but, contrary to hypotheses, the relation was positive due to the inverse relation between psychological autonomy granting and effortful control ( $\beta = .011, p < .05$ ).

**Gender as a moderator.** Gender did not seem to moderate the pattern of relations between time 1 parenting and time 2 effortful control and antisocial behavior. The chi square difference test between the unconstrained and constrained models revealed a non-significant difference,  $\chi^2_{\text{diff}}(28) = 14.36, p > .05$ .



**Figure 2.2.** Diagram of significant paths and squared correlations for hypothesized model based on mother-reported parenting

*Note.* Values indicate standardized beta weights. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . The covariate is indicated by a dashed rectangle, and was allowed to covary with the time 1 variables (double-headed arrows not pictured here), and a single-headed arrow was drawn to time 2 Antisocial Behavior but the path was non-significant. Error terms at time 2 were allowed to covary (double-headed arrow not pictured here).

**Table 2.5**

*Summary table of standardized beta coefficients, standard errors, and probability levels for hypothesized models based on mother and adolescent reports of parenting*

Path	Mother			Adolescent		
	$\beta$	SE	p	$\beta$	SE	p
PAG1→EC2	-.053	.026	.011	-.065	.021	.003
PAG1→AB2	.022	.013	.511	.015	.010	.648
AI1→EC2	.095	.039	<.001	.063	.028	.014
AI1→AB2	.068	.020	.047	.002	.013	.967
Know1→EC2	.111	.031	<.001	.036	.024	.180
Know1→AB2	-.087	.016	.021	-.131	.012	.003
Track1→EC2	-.012	.022	.592	-.069	.011	.002
Track1→AB2	.052	.011	.135	-.007	.005	.845
LS1→EC2	-.013	.009	.533	-.027	.008	.216
LS1→AB2	-.080	.006	.048	-.184	.005	<.001
EC1→EC2	.845	.020	<.001	.874	.021	<.001
EC2→AB2	-.212	.013	<.001	-.162	.012	<.001
AB1→AB2	.539	.036	<.001	.483	.037	<.001

*Note.* PAG = psychological autonomy granting, AI = acceptance-involvement, Know = knowledge, Track = tracking, LS = limit setting, EC = effortful control, AB = antisocial behavior. 1 and 2 refer to the two times of measurement.

### Alternate Analyses

Two alternate analyses were tested to assess the extent to which reciprocal relations between parenting, temperament, and antisocial behavior were possible. Specifically, the indirect relations between effortful control and authoritative parenting dimensions through adolescent antisocial behavior were being examined. The autoregressive paths for antisocial behavior, and each of the parenting dimensions were also estimated, and age was included as a covariate as in the main analyses. The first alternate analysis is based on adolescent report, and the second is based on mother report.

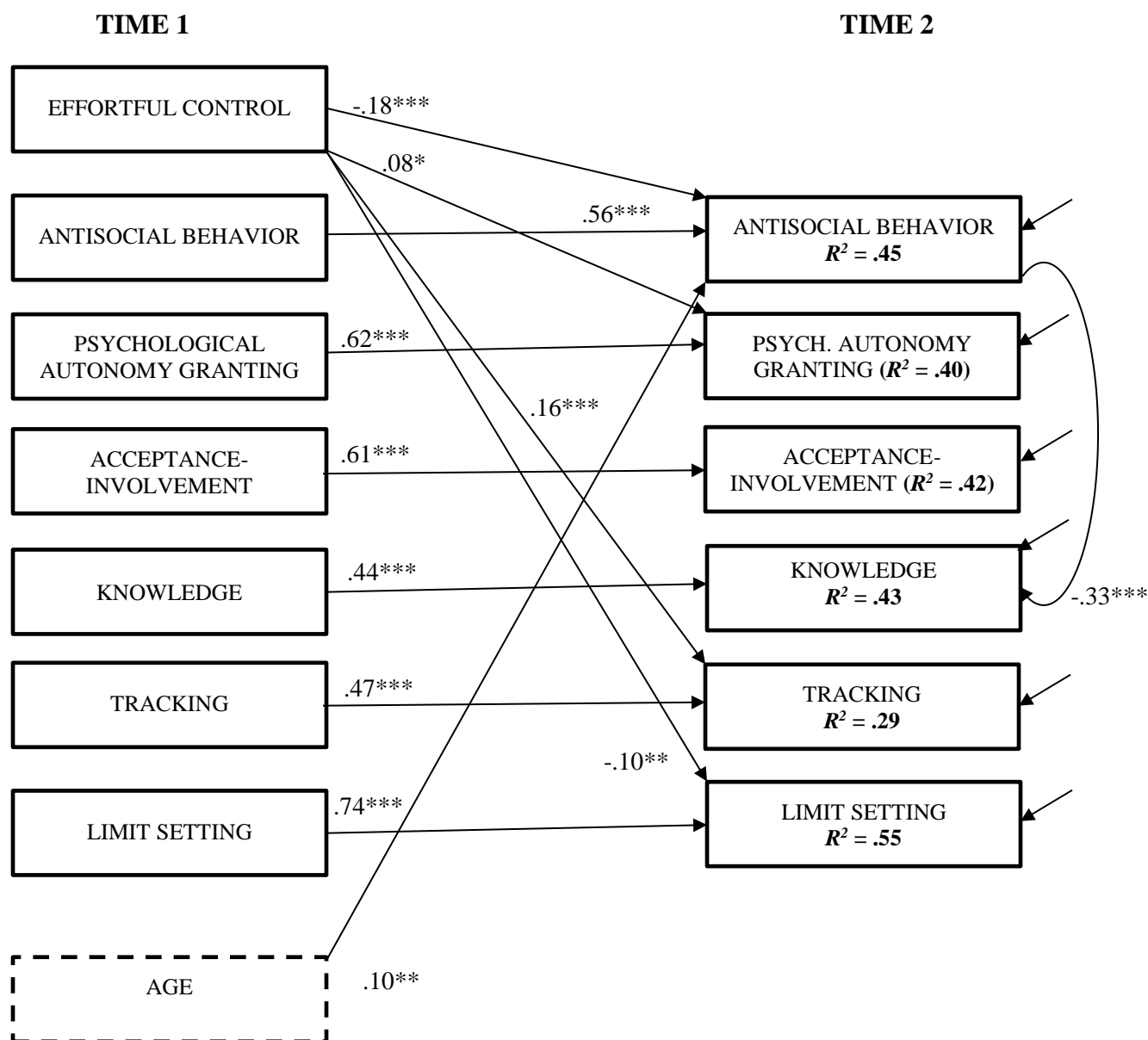
**Alternate model using adolescent report.** Figure 2.3 shows a path diagram for this model. Model fit indices suggested this model fit the data well (CFI = .955, RMSEA = .061). Antisocial behavior and each of the parenting variables were found to have significant and positive stability paths over time. Age was positively related to antisocial behavior at time 2.

In terms of direct effects between effortful control at time 1 and adolescent-reported parenting at time 2, effortful control did not predict acceptance-involvement or parental knowledge. Effortful control related to adolescents' perception of more psychological autonomy granting ( $\beta = .083, p < .05$ ) and more tracking over time ( $\beta = .157, p < .001$ ), and less limit setting ( $\beta = -.104, p < .01$ ) over time.

Effortful control at time 1 was negatively related to antisocial behavior at time 2 ( $\beta = -.179, p < .001$ ), and antisocial behavior at time 2 was negatively related to parental knowledge at time 2 ( $\beta = -.334, p < .001$ ), but not related to psychological autonomy granting, acceptance-involvement, tracking, or limit setting.

With respect to indirect effects, effortful control was indirectly and positively related to parental knowledge over time through antisocial behavior ( $\beta = .060, p < .05$ ). In other words, more effortful control at time 1 was related to less antisocial behavior at time 2, and low antisocial behavior was related to higher levels of Time 2 parental knowledge.

**Gender as a moderator.** The over time regression weights did not significantly differ between the unconstrained model and the model where the paths were constrained to be equal for male and female groups, as indicated by the chi square difference test,  $\chi^2_{\text{diff}}(36) = 20.83, p > .05$ . Therefore, gender was not a moderating variable in this model.



**Figure 2.3.** Diagram of significant paths and squared correlations for alternate model based on adolescent-reported parenting

*Note.* Values indicate standardized beta weights. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . The covariate is indicated by a dashed rectangle, and was allowed to covary with the time 1 variables and time 2 error terms (double-headed arrows not pictured here). Error terms at time 2 were allowed to covary (double-headed arrow not pictured here).



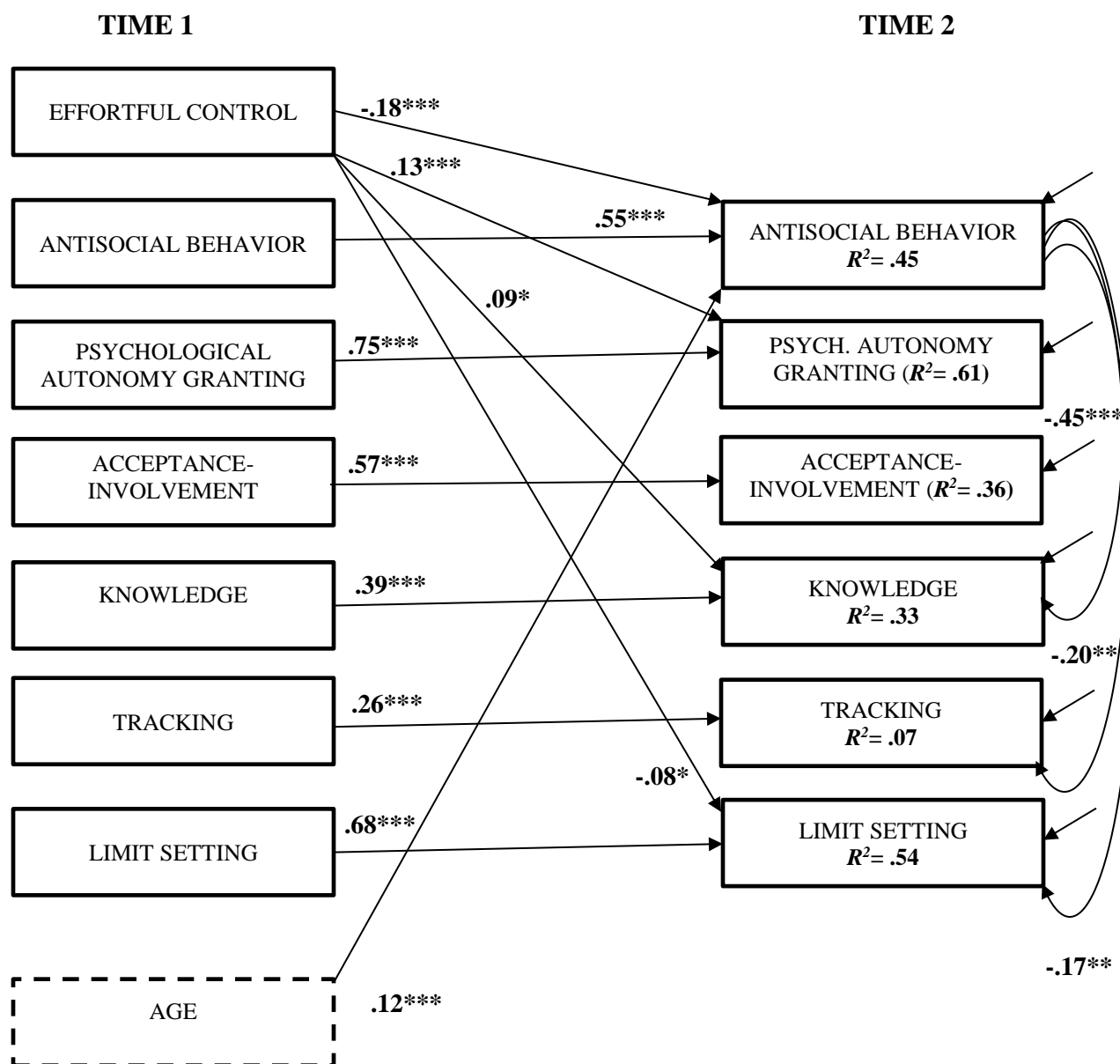
**Alternate model using mother report.** Figure 2.4 shows the path diagram for this model including significant paths and squared correlations. The indices of model fit suggested slightly poorer fit to the data than the hypothesized model (CFI = .930, RMSEA = .074, 90%CI = .068-.081).

All the stability paths for antisocial behavior and each of the parenting dimensions were significant and positive. Age was positively related to antisocial behavior at time 2. Effortful control at time 1 predicted less antisocial behavior over time ( $\beta = -.184, p < .001$ ), and antisocial behavior at time 2 was negatively related to mother's perception of knowledge ( $\beta = -.449, p < .001$ ), tracking ( $\beta = -.200, p < .01$ ), and limit-setting ( $\beta = -.166, p < .01$ ), but not related to psychological autonomy granting or acceptance involvement.

In terms of direct paths between effortful control at time 1 and parenting at time 2 accounting for initial levels of parenting, effortful control predicted psychological autonomy granting and knowledge positively ( $\beta = .125, p < .001$ ;  $\beta = .090, p < .05$ ), and limit setting negatively ( $\beta = -.082, p < .05$ ). Effortful control did not predict acceptance-involvement or tracking directly over time.

There were several significant indirect effects as well, in which effortful control at time 1 predicted mother-report of parenting at time 2 through antisocial behavior at time 2. The indirect effects were positive because effortful control related negatively to antisocial behavior, and antisocial behavior related negatively to parenting. Specifically, effortful control predicted less antisocial behavior which related to more knowledge ( $\beta = .083, p < .01$ ), more tracking ( $\beta = .037, p < .05$ ), and more limit setting ( $\beta = .031, p < .05$ ).

**Gender as a moderator.** Gender did not seem to moderate the results of the path analyses, as the chi difference test between the unconstrained and constrained models did not differ significantly,  $\chi^2_{\text{diff}}(36) = 17.53, p > .05$ .



**Figure 2.4.** Diagram of significant paths and squared correlations for alternate model based on mother-reported parenting

*Note.* Values indicate standardized beta weights. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . The covariate is indicated by a dashed rectangle, and was allowed to covary with the time 1 variables and time 2 error terms (double-headed arrows not pictured here). Error terms at time 2 were allowed to covary (double-headed arrows not pictured here).

**Table 2.6**

*Summary table of standardized beta coefficients, standard errors, and probability levels for alternate models based on mother and adolescent reports of parenting*

Path	Mother			Adolescent		
	$\beta$	$SE$	$p$	$\beta$	$SE$	$p$
PAG1→PAG2	.745	.023	<.001	.623	.027	<.001
AI1→AI2	.572	.025	<.001	.613	.025	<.001
Know1→Know2	.388	.027	<.001	.444	.029	<.001
Track1→Track2	.263	.021	<.001	.471	.023	<.001
LS1→LS2	.682	.028	<.001	.738	.028	<.001
EC1→AB2	-.184	.010	<.001	-.179	.010	<.001
AB1→AB2	.547	.036	<.001	.560	.036	<.001
AB2→PAG2	.069	.101	.166	.068	.166	.274
AB2→AI2	-.104	.086	.104	-.092	.147	.134
AB2→Know2	-.449	.135	<.001	-.334	.195	<.001
AB2→Track2	-.200	.133	<.01	-.130	.270	.052
AB2→LS2	-.166	.378	<.01	-.032	.433	.574
EC1→PAG2	.125	.020	<.001	.083	.032	<.05
EC1→AI2	-.031	.017	.466	.014	.028	.726
EC1→Know2	.090	.025	<.05	.013	.035	.741
EC1→Track2	-.033	.026	.526	.157	.053	<.001
EC1→LS2	-.082	.069	<.05	-.104	.080	<.01

*Note.* PAG = psychological autonomy granting, AI = acceptance-involvement, Know = knowledge, Track = tracking, LS = limit setting, EC = effortful control, AB = antisocial behavior. 1 and 2 refer to the two times of measurement.

## Discussion

The current study primarily examined whether the link between parenting and antisocial behavior in adolescence was indirect through adolescent effortful control. Secondly, it examined the extent to which effortful control is related to parenting directly and indirectly through adolescent antisocial behavior, to assess whether there were reciprocal relations between the variables (i.e., that parents and adolescents mutually influence one another). In the first model, the authoritative parenting dimensions, psychological autonomy granting, acceptance-involvement, and parental knowledge were expected to positively relate to effortful control over time, and effortful control abilities were expected to negatively relate to adolescent engagement in antisocial behavior. Parental limit-setting (i.e., weekday and weeknight curfew), an aspect of behavioral control, was expected to be negatively related to antisocial behavior over time directly, and indirectly through effortful control. Unlike the other parenting dimensions, tracking was expected to be negatively related to effortful control, and positively related to antisocial behavior (Stattin & Kerr, 2000). In the second model, effortful control was expected to relate positively to parenting over time directly, and negatively to antisocial behavior over time, which was itself expected to be related to less authoritative parenting. The path models used to test these research questions included the autoregressive paths of the mediator and outcome variables, to ensure that significant results between the predictor and outcome variables were unique and were not confounded by stability effects.

In the correlation analyses, an unexpected finding was that the zero-order correlation between age and effortful control at Time 2 was negative. Most research

concerning effortful control indicates a linear increase of effortful control with age. However, much of the research concerning effortful control involves young children (e.g., Kochanska & Kim, 2014) and relies on either parent or teacher reports of effortful control or behavioral and observational measures rated by an examiner (e.g., Eisenberg et al., 2005). It could be that during adolescence, individuals are less likely to think through the long-term consequences of their behaviors and more likely to consider immediate consequences. Further, as antisocial behavior increased on average over time, and as effortful control was negatively related to antisocial behavior, it could be that while adolescents were on average engaging in more antisocial behavior, their effortful control abilities suffered or were not being exercised in the way measured by this scale for the duration of the study. In the path analyses, age was included as a covariate, so that effects were above and beyond those due to age.

In the analyses of the first and second models, all lag-1 stability paths were significant, suggesting that little change occurred in the relative standings of effortful control, antisocial behavior, and authoritative parenting dimensions between times of measurement. Effortful control consistently showed the greatest stability over time. Rothbart and Derryberry's (1981) conceptualization of temperament as being constitutionally-based implies that it is an open system "influenced over time by heredity, maturation, and experience" (p.40). This suggests that effortful control can be influenced by an individual's environment, including parenting. The current findings suggest, however, that when accounting for time 1 effortful control, the effect size of parenting on effortful control is small. It may be that effortful control is more amenable to change in children than in adolescence. Thus, in terms of parent management training aimed at

educating parents with antisocial adolescents (e.g., Forgatch & Patterson, 2010), the current findings suggest that training which views temperament as something to be accommodated more so than altered may be a more effective approach. Parenting and antisocial behavior were very stable as well but had smaller autoregressive effects than effortful control, and therefore, may be more amenable to change and thus may be a better focus for intervention efforts. Even while accounting for the high stability of these variables, however, some of the parenting dimensions still had significant effects on effortful control over time, and on antisocial behavior directly and indirectly through effortful control. First, the direct and indirect effects of parenting on antisocial behavior are discussed, followed by a discussion of the direct and indirect effects of temperament on parenting.

### **Indirect Effects of Parenting on Antisocial Behavior through Effortful Control**

First and foremost, it was important for the hypothesized, parent-led path model to show that effortful control related to antisocial behavior negatively, which it did, even while accounting for initial levels of antisocial behavior. In the analyses based on both mother and adolescent reports of parenting, effortful control at time 2 was negatively related to antisocial behavior at time 2, controlling for the stability of antisocial behavior. (And in the child-led model, effortful control at time 1 predicted lower levels of antisocial behavior at time 2, controlling for the effects of age and the auto-correlation of antisocial behavior.) This provides support for DeLisi and Vaughn's (2014) temperament theory of antisocial behavior that focuses on the role of self-regulation deficits in the emergence of criminal conduct and negative interactions in the criminal justice system, as well as with Nigg's (2006) theory of temperamental pathways leading to

psychopathology, specifically, that low effortful control is a risk for greater externalizing behavior problems. It also aligns with previous research which has found negative correlations between effortful control and externalizing problems, such as aggression and delinquency, in first and second grade children (Eisenberg et al., 2009) and in ninth grade children (de Kemp et al., 2009). The finding suggests that effortful control is relevant to antisocial behavior in adolescence as well, and supports the idea that individuals with poorer effortful control abilities are less likely to inhibit impulses, and less likely to manage negative emotions like frustration, thereby leading to greater involvement in aggressive and antisocial behaviors. In contrast, individuals with strong effortful control abilities tend to engage in less antisocial behavior, probably because they are more likely to consider the long-term consequences of their behaviors and to consider the impact their actions have on other people.

Overall, there was evidence of indirect relations between different dimensions of parenting and antisocial behavior through adolescent effortful control. Specifically, there were significant indirect effects of knowledge and acceptance-involvement on antisocial behavior over time through effortful control, as well as significant indirect effects for psychological autonomy granting and tracking, although the nature of these effects were varied.

With respect to the indirect effect of acceptance-involvement, as predicted, acceptance-involvement related to more effortful control over time, which was related to less antisocial behavior. Indeed, according to both adolescent and mother reports of parenting, acceptance-involvement at time 1 was positively related to effortful control at time 2. This suggests that in homes where mothers showed greater levels of warmth and



responsiveness to their children, adolescents developed a stronger ability to inhibit their impulses, activate certain behaviors, and control their attention than adolescents whose mothers showed less warmth and responsiveness. Theoretically, the current finding is consistent with the idea that parental warmth makes it more likely for children to acquire parental values because of an increased desire to please parents or to be like them (Grusec, Goodnow, & Kuczynski, 2000) which should improve effortful control abilities with respect to antisocial behavior. It is also consistent with attachment theory, such that having a stronger attachment relationship with parents affords adolescents the opportunity to seek external support when needed (Skinner & Zimmer-Gembeck, 2007) which should also improve self-regulative abilities like coping. This self-regulative capacity protects the adolescent from engaging in antisocial behavior, as suggested by theorists such as DeLisi and Vaughn (2014) and Frick and Morris (2004). The current finding builds on the correlation found by Lengua and Kovacs (2005) among children between maternal acceptance and maternal involvement with self-regulation abilities, by providing support for a longitudinal relation in an adolescent sample, and by examining the parenting-temperament relation in an indirect effect on antisocial behavior.

Similarly, there was an indirect effect between mother-reported knowledge and adolescent antisocial behavior through effortful control, so that more knowledge at time 1 related to better effortful control abilities at time 2, which itself was related to less involvement in antisocial behavior. From this finding, it seems that mothers with better knowledge of their adolescents' friendships, activities, and whereabouts are better suited to help them execute sound decision making and exercise self-regulation because the parent-child relationship is one characterized by trust and openness (Kerr, Stattin, &

Trost, 1999). Also, because mothers who have more knowledge tend to be more consistent in their discipline (Patterson & Fisher, 2002), it may be that improvements in effortful control were due to more effective enforcement of rules and limits which is made possible by having more knowledge. Alternately, because of the relation between adolescent self-disclosure and parental knowledge (Kerr & Stattin, 2000), it is possible that adolescents who are better self-regulators disclose more to their parents thereby increasing their knowledge. As will be discussed soon, the alternate analyses found that effortful control at time 1 did not predict adolescent-reported parental knowledge at time 2, but it did relate to mother-reported knowledge at time 2. In other words, in the current sample, it seems that parental knowledge contributed to positive change in effortful control, and vice versa. But with respect to the current finding, parental knowledge related indirectly to less antisocial behavior by its positive relation with effortful control which was negatively associated with antisocial behavior.

Together, the significant indirect findings for parental knowledge and acceptance-involvement on antisocial behavior through adolescent effortful control suggest that mothers who are knowledgeable about their adolescents' friendships, activities, and whereabouts, and who display warmth and responsiveness toward their adolescent, communicate to their child that they are a trustworthy authority. In such an environment, effortful control may be enhanced and antisocial behavior is generally reduced.

Conversely, psychological autonomy granting and tracking were negatively related to effortful control over time, so that more psychological autonomy granting led to less effortful control, which was related to more antisocial behavior. This pattern diverged from what was expected based on zero-order correlations, which suggested that

psychological autonomy granting would be related to more effortful control. Similarly, more tracking was related to decreased effortful control, which was associated with more antisocial behavior.

In terms of the negative relation between psychological autonomy granting and effortful control, if the sign change between the zero-order correlations and the path model is not due to suppression effects whereby the presence of other variables in the model cause the relation between psychological autonomy granting and effortful control to change from positive to negative, it is possible that a high level of psychological autonomy granting is reflective of a permissive or uninvolved parenting style. Indeed, Wei and Kendall (2014) describe the permissive parenting style as being characterized by high acceptance, low demands, and high autonomy granting. Moreover, Lengua et al. (2014) found a positive association between maternal scaffolding (guidance/structure, autonomy granting, and nonintrusive control) and executive control (attention and inhibitory control) in 3-year-old children, which might suggest that autonomy granting *in combination with other parenting factors* leads to improved effortful control. The current finding is novel in that it applies to adolescents instead of children, and in that it showed the unique effects of psychological autonomy granting on effortful control apart from the effects of other aspects of parenting. The current finding could suggest that adolescents who have been given great freedom to act on their emotional desires without a parent's guidance or redirection when necessary, may be less likely to engage in the type of thinking about the long-term consequences or benefits of their choices. If there is a lack of meaningful dialogue about their own feelings, they may be less likely to consider the feelings of others, to adopt the values of their parents, or to develop strong self-regulation

abilities. Based on past research, Silkenbeumer, Schiller, Holodynski, and Kärtner (2016) propose a model for the development of self-regulation in young children through parental emotion coaching and co-regulation. While this model is directed to children, its general approach may still apply to adolescents. The approach precludes merely allowing an adolescent the autonomy to experience and express his or her emotions, and rather it requires the involvement and direction of the parent to teach age-appropriate strategies for emotion regulation. It is also possible that giving autonomy in the absence of behavioral control too early in the adolescents' development does not provide the adolescent with sufficient motivation to be self-disciplined. Instead, the social demands and pressures of adolescence can exceed the adolescent's ability to use wise judgment (e.g., when an adolescent chooses to spend time with friends rather than completing their school work first), referred to by Moffitt (1993) as a "maturity gap". Barnes and Beaver (2010) have found evidence which supports that this maturity gap between adolescent biological maturity and social maturity is related to delinquency, especially for male adolescents. In other words, it is possible that, if mothers do not give sufficient direction and guidance to adolescents learning to regulate emotions and make thoughtful decisions, including through co-regulation (e.g., Silkenbeumer, Schiller, Holodynski, & Kärtner, 2016), effortful control abilities may suffer and thus may be related to more involvement with antisocial behavior.

According to hypotheses, the indirect relation between adolescent-reported tracking and antisocial behavior was positive, because of the negative effect of tracking on effortful control. Based on this finding, it could be said that parents who try to solicit information from their children without allowing their child to spontaneously disclose

what they wish to share may be inadvertently communicating to their child that they can rely on their parents to initiate conversations about their behavior, friendships, and whereabouts. In other words, the adolescent is not challenged to grow in initiating sometimes difficult conversations with his or her parents. However, if a parent tracks minimally without being overly intrusive, the adolescent may perceive the parent's concern as legitimate and appropriate (Keijsers & Laird, 2014), and may initiate conversations in the future with their parents (i.e., thereby strengthening activation control). They also may be more likely to inhibit behaviors that they know their parents are likely to be concerned about, once again without sensing that their parents are displaying suspicious, untrusting behaviors toward them through high levels of tracking and trying to know.

Additionally, this finding points to the idea that parental attempts to track yields different results depending on adolescent temperament. As a recent example of this, Crocetti et al. (2016) found that adolescent empathy moderates the relation between parental solicitation and antisocial behaviors, so that solicitation was related to more antisocial behavior for adolescents who were higher in empathy. However, parental tracking (also referred to in the literature as solicitation or trying to know) has not been previously researched in respect to effortful control, even though Guilamo-Ramos, Jaccard, and Dittus (2010) have suggested that self-regulation is an individual-level process that could be brought to bear on research regarding parental monitoring. Nonetheless, with the current finding, it is implied that if a mother's tracking is construed negatively by her adolescent child, or if an adolescent is not given the opportunity to exercise self-regulation because of high maternal attempts to track, adolescent effortful

control is less likely to develop, and consequently, individuals may become more prone to engage in antisocial behavior.

Finally, limit setting did not directly relate to effortful control, nor was it indirectly related to antisocial behavior through effortful control. It was hypothesized that if adolescents were given a form of external regulation by their parents which required them to stay within a certain limit (i.e., curfew), they would exercise their self-regulation abilities and therefore improve their effortful control. For example, they would have to go home on time, even if they were having fun, thereby exercising inhibitory and activation control. However, in neither the adolescent-reported nor mother-reported model of parenting was this effect of limit setting on effortful control significant. As mentioned earlier though, limit setting did directly relate to antisocial behavior negatively. This finding aligns with and provides some support for a common legal ramification for antisocial behavior, namely court-ordered curfew, perhaps as it helps to reduce time spent in criminogenic settings (Janssen, Deković, & Bruinsma, 2014). In other words, limit setting may reduce antisocial behavior predominantly through a mechanism other than increasing self-regulation, by reducing time in settings with peers where deviancy training might occur. Furthermore, limit setting may have an effect on adolescent behavior rather than adolescent effortful control because it involves a greater degree of external regulation than other aspects of authoritative parenting.

In summary, this study's results concerning the parent-led model were consistent with the findings of previous mediation studies which have found indirect links between parenting and behavior problems through self-regulation (e.g., Chang et al., 2011; Eisenberg et al., 2005; Finkenauer, Engels, & Baumeister, 2005; Kochanska & Kim,

2014). However, the study is unique in that it uses longitudinal analyses that account for initial levels of effortful control and antisocial behavior, it examines a broader conceptualization of parenting to include behavioral as well as relational components, it explores these relations in an adolescent sample, and it examines the possibility of reciprocal effects.

### **Indirect Effects of Effortful Control on Parenting through Antisocial Behavior**

With respect to the alternate, child-led model which examined the possibility that adolescent effortful control predicted future parenting through antisocial behavior, there was a significant negative effect from effortful control at time 1 to antisocial behavior at time 2, and evidence that antisocial behavior at time 2 was negatively related to authoritative parenting at time 2. Specifically, antisocial behavior was significantly related to parental knowledge, limit setting, and tracking at time 2, but not related to psychological autonomy granting or acceptance-involvement.

With respect to the nature of the indirect effects, effortful control was indirectly and positively related to parental knowledge, limit setting, and tracking, over time through antisocial behavior. In other words, an adolescent's effortful control abilities protected him or her from involvement in antisocial behavior, and low antisocial behavior was related contemporaneously to higher levels of parental knowledge, limit setting, and tracking. These are relatively novel findings as Kiff, Lengua, and Zalewski (2011) noted that few studies have examined whether self-regulation elicits parenting behaviors, and that these tests have not been conducted in adolescent samples.

These findings suggest that adolescent temperament, in this case effortful control, is indeed related to parenting, both directly and indirectly through its relation to antisocial

behavior. Parents are more likely to be knowledgeable of their adolescent (due largely to adolescent self-disclosure), to feel comfortable asking their adolescent about their friendships, etc., and to maintain limits about curfews, when adolescents show greater effortful control and engage in less antisocial behavior. In other words, adolescent temperament and behavior are related to significant changes in maternal parenting. Parent management training, then, in helping parents with antisocial youth (e.g., Forgatch & Patterson, 2010), rightly involves teaching parents how to respond to temperament traits (e.g., poor effortful control) and behaviors (e.g., high antisocial behavior) that tend to evoke negative parenting strategies like withdrawing and becoming uninvolved or becoming hypervigilant and overbearing. If parents can avoid coercive processes, despite a strong inclination toward engaging in them, parents may help reduce the likelihood of antisocial behavior in temperamentally at-risk youth by instead enforcing curfews, and seeking to maintain an adequate level of knowledge, even through the use of reasonable tracking. Indeed, as the results of the current study indicate, parenting had direct effects on antisocial behavior and temperament had direct effects on parenting.

### **Direct Longitudinal Parenting Effects on Antisocial Behavior**

Because path analyses controlled for the autoregressive effects of the mediator and outcome variables, the findings of the current study reflect changes in antisocial behavior over time. The current study found that parental knowledge, according to both mother and adolescent reports of parenting (which also included self-disclosure), predicted antisocial behavior prospectively. In other words, adolescents who rated their mothers as possessing lower levels of knowledge at time 1 tended to report engaging in more antisocial behavior at time 2 than those adolescents who rated their mothers as



having higher levels of knowledge. Similarly, adolescents were less likely to engage in antisocial behavior at time 2 when their mothers reported higher levels of knowledge at time 1. The standardized beta weights indicated a larger effect size of adolescent-reported parental knowledge on antisocial behavior than for mother-reported parental knowledge on antisocial behavior. This aligns with other researchers who suggest that the adolescent's perception of parental monitoring knowledge, perhaps more than the mother's actual monitoring knowledge, helps keep the adolescent from engaging in antisocial behaviors (Jaccard, Guilamo-Ramos, Bouris, & Dittus, 2010; Padilla-Walker et al., 2008).

Similarly, limit setting at time 1 was significantly and negatively related to antisocial behavior at time 2 accounting for previous involvement in antisocial behavior, and independent of the effects of the other parenting dimensions. This effect was found for both informants of parenting, and was equally applicable to both male and female adolescents. Although, a comparison of the standardized beta weights indicates that the effect was stronger according to the adolescent reports of limit setting, which points to the importance of adolescent perceptions of parenting in predicting behavioral outcomes. While it is possible that the current measure of limit setting (i.e., curfew) reflected a general willingness of parents to enforce rules in the home for their family, thereby relating to lower levels of antisocial behavior, another possibility, and one that is supported by previous research, is that curfew specifically curtailed the amount of time that adolescents could spend in unsupervised time with peers where antisocial behavior is more likely to occur (e.g., Stoolmiller, 1994; Wikström et al., 2010). Indeed, the current finding relates to, and builds on, a cross-sectional study of male and female adolescents

by Borawski, Ievers-Landis, Lovegreen, and Trapl (2003), in which they found that negotiated unsupervised time with peers, including being allowed to stay out past curfew as long as adolescents call home first, was significantly associated with increased sexual activity, and increased drug and alcohol use. In the same study, parental monitoring was negatively related to these risk behaviors for the male participants while perceived parental trust was negatively related to these risk behaviors for the female participants. In the current study, longitudinal analyses provide support for the prospective utility of both knowledge and limit setting (i.e., curfew) in predicting antisocial behavior. Specifically, the current finding suggests that having an earlier curfew is directly related to less antisocial behavior over time accounting for initial levels of antisocial behavior, whereas having a later curfew is related to more antisocial behavior over time.

In the model using mothers' reports of parenting (but not adolescents' reports of parenting), there was evidence that acceptance-involvement significantly predicted antisocial behavior at time 2 accounting for the initial level of antisocial behavior. However, the direction of the effect was opposite to what was hypothesized, and opposite to the zero-order correlation, in that acceptance-involvement was related to more instead of less antisocial behavior over time. This effect did not appear to be moderated by gender. This finding differs from previous longitudinal research which found high levels of parental support were associated with lower levels of antisocial behavior for girls but not boys (de Kemp, Overbeek, de Wied, Engels, & Scholte, 2010), and from previous cross-sectional research which found a negative relation between adolescent-reported acceptance-involvement and behavior problems (e.g., antisocial behavior, drug and alcohol use, etc.) in a large sample of adolescents (Gray & Steinberg, 1999). With respect

to the current finding, it is possible that mothers who rated themselves as being highly involved in their children's lives were perceived by adolescents as being inappropriately involved (i.e., intrusive) considering the increasing desire for autonomy during this developmental period (Blos, 1967; Delhay et al., 2012), thereby leading to more antisocial behavior. Another possibility is that what some mothers consider to be the demonstration of high acceptance toward her child, may be reflective of an indulgent or permissive parenting style if the acceptance is not tempered by appropriate behavioral control (Maccoby & Martin, 1983), thereby leading to more antisocial behavior. While the zero-order correlations may reflect evocative gene-environment effects, such that mothers are more accepting of adolescents who are engaged in lower levels of antisocial behavior, the current path analysis findings should not involve evocative effects from antisocial behavior to acceptance-involvement, because acceptance-involvement precedes antisocial behavior in time, and the auto-regressive effects are considered. Finally, it is possible that the sign change occurred from negative to positive due to suppression effects (their relation to other variables in the model) rather than because of true effects. As such, this finding should be interpreted with caution until it can be re-evaluated in future studies. As has been discussed, however, the significant indirect effect of acceptance-involvement on antisocial behavior through effortful control was negative, and followed the logic that formed the hypothesis for this parenting dimension.

Finally, even though each of the parenting dimensions were negatively correlated with antisocial behavior contemporaneously and over time (apart from tracking at time 1 for which the relation was nonsignificant), the path analyses did not provide support for the hypotheses that psychological autonomy granting or tracking predict antisocial

behavior prospectively when accounting for previous levels of antisocial behavior. According to both mother and adolescent reports of parenting, when antisocial behavior at time 1 was controlled for, psychological autonomy granting and tracking at time 1 were not significant predictors of antisocial behavior at time 2. The nonsignificant finding regarding tracking suggests that it is not the mother's trying to know which deters antisocial behavior, but rather the adolescent's perception about the mother's knowledge. It aligns with Kerr and Stattin's (2000) finding that parental solicitation was not related to adolescent delinquency or having deviant friends. The nonsignificant finding regarding psychological autonomy granting aligns with previous cross-sectional research that shows a link between psychological autonomy granting and internalizing symptoms instead of externalizing or behavior problems (Barber, Olsen, & Shagle, 1994; Gray & Steinberg, 1999). However, as has been discussed, there was evidence that these parenting variables relate to antisocial behavior over time indirectly through effortful control.

### **Direct Longitudinal Effortful Control Effects on Parenting**

In the alternate model, in addition to the indirect effects that have already been discussed and the direct associations subsumed within, there were significant direct effects between effortful control at time 1 and all the dimensions of parenting excluding acceptance-involvement at time 2. Examining the direct effects of effortful control on parenting converges with similar work in the field of emotion dysregulation, in which the ability to regulate one's fear, sadness, and anger positively predicted future parental responsiveness but not psychological control in a sample of grade 6 and 7 children (Otterpohl & Wild, 2015). However, the current measure of temperament did not include

fear, sadness, and anger, but rather effortful control, nor was there a significant effect for acceptance-involvement (similar to the responsiveness outcome in their study) or psychological control but rather psychological autonomy granting. The current study builds more closely on a cross-sectional study of 3-year-old children in which effortful control contributed to higher levels of mothers' positive control and lower levels of mothers' negative control (Karreman, van Tuijl, van Aken, & Deković, 2008), and a longitudinal study of 8- to 12-year-old children whose effortful control was negatively related to parental rejection over time (Lengua, 2006). While effortful control in the current study did not predict acceptance-involvement, it did however relate to more psychological autonomy granting, knowledge, and tracking over time, and less limit setting over time. Based on the current finding, it seems that adolescents with greater effortful control abilities perceived that their mothers were trying to know more about their friendships, whereabouts, and activities. As well, it seems that adolescents with greater effortful control abilities were given a later curfew, and granted more psychological autonomy. It could be that as the adolescent displays greater effortful control, mothers allow their adolescent child greater flexibility around curfew, because they may judge their children to be more responsible and trustworthy even when outside the home. Similarly, they may express a higher value on their adolescent's opinions and ideas, and encourage them to contribute to family discussions and planning because of their demonstrated responsibility in regulating their own emotions and behaviors by effortful control.

It is interesting here to note that the significant effects for effortful control were found predominantly for the behavioral and psychological control aspects of parenting.

This makes sense given that behavioral and psychological control dimensions of parenting serve the function of externally regulating the adolescent similar to the internal regulation of effortful control. In other words, external regulation becomes less needed and somewhat redundant when adolescents begin to show evidence of greater self-regulation abilities themselves, and therefore parents feel they can ease and relax their limits over time, by allowing later curfews, for example, or giving more psychological autonomy.

### **Limitations**

Despite the strengths of this study, there were some weaknesses as well. First, the items in both the parenting and effortful control measures assessed current parenting and current effortful control. In contrast, the measure of antisocial behavior used items that assessed antisocial behavior in the past year, causing it to be like retrospective data in a way. It is possible that this difference in the wording of the items with respect to their timing of occurrence would impact the results, such as attenuating the lag-1 effects of parenting with effortful control and antisocial behavior.

According to Cole and Maxwell (2003), it is important to consider what is the time interval that must elapse in this case for parenting to have its effect on effortful control and antisocial behavior, and for effortful control to have its effect on antisocial behavior? Is 18 months between assessments sufficient in length, or is it too long? As Kline (2005) pointed out, “even if X actually causes Y, the magnitude of  $r_{xy}$  may be low if the interval between their measurement is either too short (e.g., effects on Y take time to materialize) or too long (e.g., the effects are temporary and have dissipated)” (p.94). Eighteen months is comparable to the time interval used in similar studies (e.g., Emler &

Reicher, 1995; Prior, Sanson, & Oberklaid, 1989). However, it may be the case that the positive effects of parenting on effortful control have largely already taken place by the time individuals reach adolescence. During this developmental period, it may be that behavioral aspects of maternal parenting such as limit-setting are largely important in helping to directly limit antisocial behavior in adolescent children.

Second, there was a large proportion of missing data in this study which poses a methodological limitation. Several options for handling missing data were considered, but the expectation-maximization option available in SPSS was most suitable. Even though missing values analysis suggested that data were missing at random (i.e., there were not systematic differences between the participants who completed questionnaires at both waves and those who discontinued in the study), it is possible that estimates and results were slightly biased. However, to examine the extent to which this may have been an issue, the same analyses were conducted using the data of those participants who completed questionnaires at both waves. The nature of relations between the variables and the effects of the path analyses were the same as those found for the whole sample ( $n = 521$ ), but some of the effects failed to reach significance. Because the sample size was smaller for those who participated at both waves ( $n = 254$ ), it is possible that lower statistical power to find significant effects contributed to the fewer significant findings.

Finally, the current study only included adolescent report of antisocial behavior when the authoritative parenting and temperament measures were completed by both adolescents and mothers. However, while the self-report method for measuring delinquency and crime has been shown to be “acceptably valid and reliable for most research purposes” (Thornberry & Krohn, 2000), parent reports of antisocial behavior can

be limited by a lack of parental knowledge of their adolescents' behavior and activities outside the home. Barker, Bornstein, Putnick, Hendricks, and Suwalsky (2007) stated that the correlation between mother and adolescent report of behavior problems is low in magnitude, and that in community samples, adolescents tend to report more behavior problems than moms report of their child's behavior. In other words, mother reports of adolescent antisocial behavior may also be affected by impression management bias.

### **Strengths and Contributions**

This study had several strengths. First, it benefited by using data that included the perspectives of both mothers and their adolescent children with respect to maternal parenting and adolescent effortful control. Despite their within-time scores on the parenting and temperament measures being positively correlated with each other, the authoritative parenting dimensions were kept separate to allow for comparisons between mother and adolescent perspectives. In many other studies, mother and adolescent scores are combined and possible differences are not easily observed. In the current study, on the mean level, mothers typically rated themselves more favorably on the parenting items than adolescents rated their mothers. They also rated adolescents as generally improving in effortful control across the two waves, whereas the adolescent report of effortful control was not linearly related with age. Along these same lines, authoritative parenting was analysed by estimating the separate dimensions simultaneously, which means that the effects of each parenting dimension on effortful control or antisocial behavior were independent of the effects of the other parenting dimensions.

Additionally, this study used longitudinal auto-regressive and cross-lagged path analyses to test direct and indirect effects. One of the important reasons for using these



types of analyses is that not accounting for a possible intervening variable or stability effects can be misleading (e.g., inflate the apparent relation between predictor and outcome). However, by taking into account the effects of previous levels of mediators and outcomes, a coefficient for a cross-lagged path can tell us about the unique effect of a construct on another construct measured at a later occasion. And importantly, an autoregressive coefficient can tell us about the effect of a construct on itself measured at a later time, and it can suggest the stability of the construct (more specifically, the stability of individual differences) from one occasion to the next.

Finally, this study estimated the paths of the reciprocal relations, from effortful control to each of the parenting dimensions directly, and from effortful control to each of the parenting dimensions indirectly through adolescent antisocial behavior. Most previous work regarding these variables have examined their relations in childhood, and studies of antisocial behavior have not usually involved such conservative analyses that allow for observations to be made about bidirectionality, or account for the stability of both mediator and outcome variables over time.

### **Suggestions for Future Research**

Although this study focused on a broad conception of authoritative parenting, an important mechanism that was not assessed in the current study is the ability for parents to teach effortful control through modeling (Grolnick & Farkas, 2002). Opportunities to model effortful control may arise in the case of conflict with the adolescent or when the adolescent experiences distress. At these times, parents may demonstrate a self-controlled approach to expressing their own emotions and may respond to a child's distress with comforting and thoughtful speech. In other words, parents may activate a careful and

measured response while inhibiting or tempering an impulsive reaction despite their own feelings of frustration or sadness. Then, after the discussion has concluded, parents can flexibly redirect their attention away from the subject of the conflict or distress. Through this kind of parental modeling of self-controlled emotions and behaviors, adolescents are shown how to respond to distressing situations so that they can control their own emotions and behaviors in a similar manner (Grolnick & Farkas, 2002). Future research using longitudinal data could examine specific parenting practices, such as modeling self-control, and its relation to improvements in adolescent effortful control and reductions in adolescent antisocial behavior. Although, Vazsonyi and Huang (2010) suggest that on its own modeling is unable to shape and instill self-control, so parenting must apply its influence in other ways still.

For instance, during adolescence, the antisocial behavior of peers is significantly related to adolescent's own antisocial behavior. Thus, other variables that may influence the links between parenting, effortful control, and adolescent behavior whether positively or negatively (e.g., peers' antisocial behavior), should be examined longitudinally in future research.

### **Conclusions**

In conclusion, the current study examined the bidirectional indirect relations between authoritative parenting, effortful control, and antisocial behavior in a community sample of male and female adolescents. A series of path models were tested, using longitudinal data collected from both mother and adolescent reports. Paths to estimate correlations between time 1 variables and covariances of error terms of time 2 variables, stability effects, and cross-lagged effects of key study variables were included. In

general, results supported a temperament-based theory of antisocial behavior (DeLisi & Vaughn, 2014; Nigg, 2006), in that effortful control was contemporaneously and longitudinally related to antisocial behavior, above and beyond the effects of parenting, and accounting for initial levels of antisocial behavior. Results also supported predictions based on coercive family processes (Patterson, 1982) in that effortful control evoked positive changes in parenting (psychological autonomy granting, knowledge, tracking, and limit setting) over time, directly and indirectly through an intermediate relation with antisocial behavior. Also, results supported the main hypothesis that parenting has indirect effects on antisocial behavior through adolescent effortful control.

In terms of novel contributions, the study showed that the role of effortful control with respect to antisocial behavior is applicable to a broader age range of individuals, by finding significant relations in an adolescent sample. Effortful control has predominantly been measured in studies of children (e.g., Chang et al., 2011; Kochanska & Kim, 2014). When it has been studied in adolescents, the analyses have been cross-sectional (e.g., Finkenauer, Engels, & Baumeister, 2005) or they have focused on relational aspects of parenting to the exclusion of behavioral control aspects of parenting (e.g., Eisenberg et al., 2005). In the current study, along with the recognition that effortful control is primarily a biologically-based ability, effortful control is viewed (and evidence was found to support it being viewed) as an open system, in that it is subject to change over time. This is consistent with the temperament theories of Rothbart and colleagues (e.g., Rothbart & Bates, 2006). Nonetheless, the high stability path results of effortful control may suggest that by adolescence, effortful control is generally established.

There are several implications based on these findings. First, parents may be able to help reduce antisocial behavior by assigning earlier curfews. Limits placed on adolescents should be reasonable and age-appropriate. Next, these findings imply that parents can help improve adolescent self-regulation abilities and reduce antisocial behavior by showing warmth and responsiveness to their adolescent children, and by being knowledgeable about their lives. Open communication between parents and adolescents allow for children to safely disclose information on their own terms, and allows parents to have the knowledge needed to intervene if necessary. Finally, the findings suggest that delineating parenting dimensions to include behavioral aspects such as tracking and limit-setting is important for future research endeavours in the study of adolescent antisocial behavior (given how they were differentially related to antisocial behavior through a negative association with effortful control) as is the need for using more statistically stringent analyses when testing possible bidirectional and indirect effects of parenting and temperament.

## References

- Barber, B.K. (Ed.). (2002). *Intrusive parenting: How psychological control affects children and adolescents*. Washington, DC: American Psychological Association.
- Barber, B.K., Olsen, J.E., & Shagle, S.C. (1994). Associations between parental psychological and behavioral control and youth internalized and externalized behaviors. *Child Development*, 65(4), 1120-1136.
- Barker, E.T., Bornstein, M.H., Putnick, D.L., Hendricks, C., & Suwalsky, J.T.D. (2007). Adolescent-mother agreement about adolescent problem behaviors: Direction and predictors of disagreement. *Journal of Youth and Adolescence*, 36(7), 950-962.
- Barker, E.D. Séguin, J.R., White, H.R., Bates, M.E., Lacourse, E., Carbonneau, R., & Tremblay, R.E. (2007). Developmental trajectories of male physical violence and theft: Relations to neurocognitive performance. *Archive of General Psychiatry*, 64(5), 592-599.
- Barnes, J.C., & Beaver, K.M. (2010). An empirical examination of adolescence-limited offending: A direct test of Moffitt's maturity gap thesis. *Journal of Criminal Justice*, 38, 1176-1185.
- Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation modeling perspective*. Hoboken, NJ: Wiley.
- Borawski, E.A., Ievers-Landis, C.E., Lovegreen, L.D., & Trapl, E.S. (2003). Parental monitoring, negotiated unsupervised time, and parental trust: The role of perceived parenting practices in adolescent health risk behaviors. *Journal of Adolescent Health*, 33(2), 60-70.
- Baumrind, D., Larzelere, R.E., & Owens, E.B. (2010). Effects of preschool parents' power assertive patterns and practices on adolescent development. *Parenting: Science and Practice*, 10(3), 157-201.
- Berkowitz, L. (1993). *Aggression: Its causes, consequences, and control*. Temple University Press, Philadelphia.
- Blos, P. (1967). The second individuation process of adolescence. *Psychoanalytic Study of the Child*, 22, 162-186.
- Burk, W.J., & Laursen, B. (2010). Mother and adolescent reports of associations between child behavior problems and mother-child relationship qualities: separating shared variance from individual variance. *Journal of Abnormal Child Psychology*, 38, 657-667.

- Chang, Olson, Sameroff, & Sexton (2011). Child effortful control as a mediator of parenting practices on externalizing behavior: Evidence for a sex-differentiated pathway across the transition from preschool to school. *Journal of Abnormal Child Psychology*, 39(1), 71-81.
- Cole, D.A. & Maxwell, S.E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology*, 112(4), 558-577.
- Cole, P.M., Michel, M.K., & O'Donnell Teti, L. (1994). The development of emotional regulation and dysregulation: A clinical perspective. *Monographs of the Society for Research in Child Development*, 59(2/3), 73-100.
- Crocetti, E., Van der Graaff, J., Moscatelli, S., Keijsers, L., Koot, H.M., Rubini, M., Meeus, W., & Branje, S. (2016). A longitudinal study on the effects of parental monitoring on adolescent antisocial behaviors: The moderating role of adolescent empathy. *Frontiers in Psychology*, 7(1726), 1-11.
- Dane, A., McPhee, J., Root, L. & Derevensky, J. (2004). *Parental socialization of youth gambling*. Report to the Ontario Problem Gambling Research Centre, Guelph, Ontario.
- Davenport, E., Yap, M.B., Simmons, J.G., Sheeber, L.B., & Allen, N.B. (2011). Maternal and adolescent temperament as predictors of maternal affective behavior during mother-adolescent interactions. *Journal of Adolescence*, 34(5), 829-839.
- de Kemp, R., Vermulst, A., Finkenauer, C., Scholte, R., Overbeek, G., Rommes, E., & Engels, R. (2009). Self-control and early adolescent antisocial behavior: A longitudinal analysis. *The Journal of Early Adolescence*, 29, 497-517. doi: 10.1177/0272431608324474.
- de Kemp, R., Overbeek, G., de Wied, M., Engels, R., & Scholte, R. (2010). Early adolescent empathy, parental support, and antisocial behavior. *The Journal of Genetic Psychology*, 168(1), 5-18.
- Delhay, M., Kempenaers, C., Burton, J., Linkowski, P., Stroobants, R., & Goossens, L. (2012). Attachment, parenting, and separation-individuation in adolescence: A comparison of hospitalized adolescents, institutionalized delinquents, and controls. *The Journal of Genetic Psychology*, 173(2), 119-141.
- DeLisi, M. & Vaughn, M.G. (2014). Foundation for a temperament-based theory of antisocial behavior and criminal justice system involvement. *Journal of Criminal Justice*, 42, 10-25.

- Eisenberg, N., Chang, L., Ma, Y., & Huang, X. (2009). Relations of parenting style to Chinese children's effortful control, ego resilience, and maladjustment. *Developmental Psychopathology*, 21(2), 455-77. doi: 10.1017/S095457940900025X.
- Eisenberg, N., Fabes, R.A., Shepard, S.A., Guthrie, I.K., Murphy, B.C., & Reiser, M. (1999). Parental reactions to children's negative emotions: Longitudinal relations to quality of children's social functioning. *Child Development*, 70(2), 513-534.
- Eisenberg, N., Valiente, C., Morris, A.S., Fabes, R.A., Cumberland, A., Reiser, M., Gershoff, E.T., Shepard, S.A., & Losoya, S. (2003). Longitudinal relations among parental emotional expressivity, children's regulation, and quality of socioemotional functioning. *Developmental Psychology*, 39(1), 3-19.
- Eisenberg, N., Zhou, Q., Spinrad, T.L., Valiente, C., Fabes, R.A., & Liew, J. (2005). Relations among positive parenting, children's effortful control, and externalizing problems: A three-wave longitudinal study. *Child Development*, 76(5), 1055-1071.
- Ellis, L.K., & Rothbart, M.K. (2001, April). *Revision of the Early Adolescent Temperament Questionnaire*. Poster presented at the biennial meeting of the Society for Research in Child Development, Minneapolis, MN.
- Ellis, E., Rothbart, M.K. & Posner, M.I. (2004). Individual differences in executive attention predict self-regulation and adolescent psychosocial behaviors. *Annals of New York Academy of Sciences*, 1031, 337-340.
- Emler, N., & Reicher, S. (1995). *Adolescence and delinquency: The collective management of reputation*. Oxford: Blackwell. 267pp.
- Finkenauer, C., Engels, R.C., & Baumeister, R.F. (2005). Parenting behavior and adolescent behavioral and emotional problems: The role of self-control. *International Journal of Behavioral Development*, 29(1), 58-69.
- Forgatch, M.S., & Patterson, G.R. (2010). Parent Management Training - Oregon Model: An intervention for antisocial behavior in children and adolescents. In J.R. Weisz, A.E. Kazdin (Eds.), *Evidence-based psychotherapies for children and adolescents*, 2<sup>nd</sup> ed. Guilford; New York: pp. 159-178.
- Foster, E.M., Fang, G.Y., & Conduct Problems Prevention Research Group (2004). Alternative methods for handling attrition: An illustration using data from the Fast Track Evaluation. *Evaluation Review*, 28(5), 434-464.
- Frick, P.J. & Morris, A.S. (2004). Temperament and developmental pathways to conduct problems. *Journal of Clinical Child and Adolescent Psychology*, 33(1), 54-68.

- Gardner, T.W., Dishion, T.J., & Connell, A.M. (2008). Adolescent self-regulation as resilience: Resistance to antisocial behavior within the deviant peer context. *Journal of Abnormal Child Psychology*, 36(2), 273-284.
- Gecas, V., & Seff, M.A. (1990). Families and adolescents: A review of the 1980s. *Journal of Marriage and the Family*, 52, 941-958.
- Gray, M.R., & Steinberg, L. (1999). Unpacking authoritative parenting: Reassessing a multidimensional construct. *Journal of Marriage and Family*, 61(3), 574-587.
- Grolnick, W.S. & Farkas, M. (2002). Parenting and the development of self-regulation. In M.H. Bornstein (Ed.), *Handbook of parenting; Vol. 5: Practical issues in parenting* (pp. 89-110). Hillsdale, NJ: Erlbaum.
- Grusec, J.E., Goodnow, J.J., & Kuczynski, L. (2000). New directions in analyses of parenting contributions to children's acquisition of values. *Child Development*, 71(1), 205-211.
- Henry, C. S., & Hubbs-Tait, L. (2013). New directions in authoritative parenting. In R. E. Larzelere, A. S. Morris, & A. W. Harrist (Eds.), *Authoritative parenting: Synthesizing nurturance and discipline for optimal child development* (pp. 237-264). Washington, DC: Association Press.
- Hoffman, M.L. (2000). *Empathy and moral development: Implications for caring and justice* Cambridge, UK: Cambridge University Press.
- Hu, L., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55.
- Human-Hendricks, A.R. & Roman, N.V. (2014). What is the link between antisocial behavior of adolescents and parenting: A systematic review of parental practices to manage antisocial behavior. *Journal of Communications Research*, 6(4), 439-464.
- Jaccard, J., Guilamo-Ramos, V., Bouris, A., & Dittus, P. (2010). A three-process system of parental monitoring and supervision. In V. Guilamo-Ramos, J. Jaccard, & P. Dittus (Eds.), *Parental Monitoring of Adolescents: Current Perspectives for Researchers and Practitioners* (pp. 176-203). New York: Columbia University Press.
- Janssen, H.J., Deković, M., & Bruinsma, G.J.N. (2014). Parenting and time adolescents spend in criminogenic settings: A between- and within-person analysis. *The British Journal of Criminology*, 54(4), 551-567.



- Karreman, A., van Tuijl, C., van Aken, M. A. G., & Dekovic, M. (2008b). The relation between parental personality and observed parenting: The moderating role of preschoolers' effortful control. *Personality and Individual Differences*, 44(3), 723–734.
- Keijsers L., & Laird R.D. (2014). Mother-adolescent monitoring dynamics and the legitimacy of parental authority. *Journal of Adolescence*, 37, 515–524.
- Kerr, M., & Stattin, H. (2000). What parents know, how they know it, and several forms of adolescent adjustment: Further support for a reinterpretation of monitoring. *Developmental Psychology*, 36(3), 366–380.
- Kerr, M., Stattin, H., & Trost, K. (1999). To know you is to trust you: Parents' trust is rooted in child disclosure of information. *Journal of Adolescence*, 22(6), 737–752.
- Kiff, C.J., Lengua, L.J., & Zalewski, M. (2011). Nature and nurturing: Parenting in the context of child temperament. *Clinical Child and Family Psychology Review*, 14(3), 251–301.
- Kline, R.B. (2005). *Principles and practice of structural equation modeling*, 4<sup>th</sup> Edition. New York, NY: Guilford.
- Kochanska, G. (2002). Mutually responsive orientation between mothers and their young children: A context for the early development of conscience. *Psychological Science*, 11(6), 191–195.
- Kochanska, G. & Kim, S. (2014). A complex interplay among the parent-child relationship, effortful control, and internalized, rule-compatible conduct in young children: Evidence from two studies. *Developmental Psychology*, 50(1), 8–21.
- Lamborn, S.D., Mounts, N.S., Steinberg, L., & Dornbusch, S.M. (1991). Patterns of competence and adjustment among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Child Development*, 62, 1049–1065.
- Larson, R.W. (2001). How U.S. children and adolescents spend time: What it does (and doesn't) tell us about their development. *Current Directions in Psychological Science*, 10(5), 160–164.
- Larsson, H., Viding, E., Rijdsdijk, F.V., & Plomin, R. (2008). Relationships between parental negativity and childhood antisocial behavior over time: A bidirectional effects model in a longitudinal genetically informative design. *Journal of Abnormal Child Psychology*, 36(5), 633–645.
- Laursen, B. (2005). Dyadic and group perspectives on close relationships. *International Journal of Behavioral Development*, 29, 97–100.

- Le Blanc, M., & Fréchette, M. (1989). *Male criminal activity from childhood through youth: Multilevel and developmental perspectives*. New York, NY: Springer-Verlag Publishing.
- LeCuyer, E.A. & Swanson, D.P. (2016). African American and European American mothers' limit setting and their 36-month-old children's responses to limits, self-concept, and social competence. *Journal of Family Issues*, 37(2), 270-296.
- Lee, E.H., Zhou, Q., Eisenberg, N., & Wang, Y. (2013). Bidirectional relations between temperament and parenting styles in Chinese children. *International Journal of Behavioral Development*, 37(1), 57-67.
- Lengua, L. J. (2006). Growth in temperament and parenting as predictors of adjustment during children's transition to adolescence. *Developmental Psychology*, 42(2), 819-832.
- Lengua, L.J., Honorado, E., Bush, N.R. (2007). Contextual risk and parenting as predictors of effortful control and social competence in preschool children. *Journal of Applied Developmental Psychology*, 28(1), 40-55.
- Lengua, L.J., Kiff, C., Moran, L., Zalewski, M., Thompson, S., Cortes, R., & Ruberry, E. (2014). Parenting mediates the effects of income and cumulative risk on the development of effortful control. *Social Development*, 23(3), 631-649.
- Lengua, L.J. & Kovacs, E.A. (2005). Bidirectional associations between temperament and parenting and the prediction of adjustment problems in middle childhood. *Applied Developmental Psychology*, 26, 21-38.
- Loeber, R. (1990). Development and risk factors of juvenile antisocial behavior and delinquency. *Clinical Psychology Review*, 10(1), 1-41.
- Maccoby, E.E., & Martin, J.A. (1983). Socialization in the context of the family: Parent-child interaction. In P.H. Mussen (Ed.) & E.M Hetherington (Vol. Ed.), *Handbook of child psychology: Vol. 4. Socialization, personality, and social development* (4<sup>th</sup> ed., pp. 1-101). New York: Wiley.
- McCuaig-Edge, H., & Craig, W. (2012). Peers. In *The health of Canada's young people: A mental health focus*. Retrieved from <http://www.phac-aspc.gc.ca/hp-ps/dca-dea/publications/hbsc-mental-mentale/peers-camarades-eng.php>.
- Moffitt, T. E. (1993). Adolescence-limited and life-course persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, 100, 674-701.
- Morris, A.S., Silk, J.S., Steinberg, L., Myers, S.S., & Robinson, L.R. (2007). The role of the family context in the development of emotion regulation. *Social Development*, 16(2), 361-388.

- Mrug, S., Madan, A., & Windle, M. (2012). Temperament alters susceptibility to negative peer influence in early adolescence. *Journal of Abnormal Child Psychology*, 40(2), 201-209.
- Nigg, J.T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 47(3/4), 395-422.
- Otterpohl, N., & Wild, E. (2015). Cross-lagged relations among parenting, children's emotion regulation, and psychosocial adjustment in early adolescence. *Journal of Clinical Child & Adolescent Psychology*, 44(1), 93-108.
- Padilla-Walker, L.M., Carlo, G., Christensen, K.J., & Yorgason, J.B. (2012). Bidirectional relations between authoritative parenting and adolescents' prosocial behaviors. *Journal of Research on Adolescence*, 22, 400-408. doi: 10.1111/j.1532-7795.2012.00807.x
- Padilla-Walker, L.M., Nelson, L.J., Madsen, S.D., & Barry, C.M. (2008). The role of perceived parental knowledge on emerging adults' risk behaviors. *Journal of Youth and Adolescence*, 37(7), 847-859.
- Parent, J., McKee, L.G., & Forehand, R. (2016). Seesaw discipline: The interactive effect of harsh and lax discipline on youth psychological adjustment. *Journal of Child and Family Studies*, 25(2), 396-406.
- Pasalich, D.S., Waschbusch, D.A., Dadds, M.R., & Hawes, D.J. (2014). Emotion socialization style in parents of children with callous-unemotional traits. *Child Psychiatry and Human Development*, 45(2), 229-242.
- Patterson, G.R. (1982). *Coercive family process*. Eugene, OR: Castalia.
- Patterson, G.R., & Fisher, P.A. (2002). Recent developments in our understanding of parenting: Bidirectional effects, causal models, and the search for parsimony. In: M. Bornstein (Ed.), *Handbook of parenting: Practical and applied parenting*. 2nd ed. Vol. 5. Erlbaum; Mahwah, NJ: pp. 59-88.
- Pérez-Edgar, K. (2015). Effortful control in adolescence: Individual differences within a unique developmental window. *Self-Regulation in Adolescence*, 78-102.
- Pettit, G.S., Laird, R.D., Bates, J.E., Dodge, K.A., Criss, M.M. (2001). Antecedents and behavior-problem outcomes of parental monitoring and psychological control in early adolescence. *Child Development*, 72, 583-598.
- Piko, B.F., & Balázs, M.À. (2012). Authoritative parenting style and adolescent smoking and drinking. *Addictive Behaviors*, 37(3), 353-356.

- Prior, M., Sanson, A.V., & Oberklaid, F. (1989). The Australian Temperament Project. In: *Temperament in Childhood*, eds. G.A. Kohnstamm, J.E. Bates, M.K. Rothbart. New York: John Wiley, pp. 537-556.
- Reid, C.A., Roberts L.D., Roberts, C.M., & Piek, J.P. (2015). Towards a model of contemporary parenting: The parenting behaviors and dimensions questionnaire. *PLoS ONE*, 10(6), 1-23.
- Reker, D. (2010). *Relation of temperament and authoritative parenting on subtypes of adolescent aggressive behavior*. Retrieved from Brock University Digital Repository.
- Robins, R.W., Donnellan, M.B., Widaman, K.F., & Conger, R.D. (2010). Evaluating the link between self-esteem and temperament in Mexican origin early adolescents. *Journal of Adolescence*, 33(3), 403–410. <http://doi.org/10.1016/j.adolescence.2009.07.009>
- Rothbart, M.K. (2007). Temperament, development, and personality. *Current Directions in Psychological Science*, 16(4), 207-212. doi: 10.1111/j.1467-8721.2007.00505.x
- Rothbart, M.K., & Bates, J.E. (2006). Temperament. In W. Damon & R. Lerner (Series Eds.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology, Vol. 3. Social, emotional, and personality development* (6th ed., pp. 99–166). New York: Wiley.
- Rothbart, M.K., & Derryberry, D. (1981). Development of individual differences in temperament. In: M.E. Lamb & A.L Brown (Eds.) *Advances in developmental psychology, Vol. 1* (pp. 37-86). Hillsdale, NJ: Erlbaum.
- Rutter, M. (2006). *Genes and behavior: Nature–nurture interplay explained*. Oxford, UK: Blackwell Scientific.
- Shulman, G.L., Astafiev, S.V., Franke, D., Pope, D.L.W., Snyder, A.Z., McAvoy, M.P., & Corbetta, M. (2009). Interaction of stimulus-driven reorienting and expectation in ventral and dorsal frontoparietal and basal ganglia-cortical networks. *Journal of Neuroscience*, 29, 4392–4407. doi: 10.1523/JNEUROSCI.5609-08.2009
- Silkenbeumer, J., Schiller, E-M., Holodyski, M., & Kärtner, J. (2016). The role of co-regulation for the development of social-emotional competence. *Journal of Self-Regulation and Regulation*, 2, 17-31.
- Skinner, E.A., & Zimmer-Gembeck, M.J. (2007). The development of coping. *Annual Review of Psychology*, 58, 119-144.

- Smits, I., Soenens, B., Vansteenkiste, M., Luyckx, K., & Goossens, L. (2010). Why do adolescents gather information or stick to parental norms? Examining autonomous and controlled motives behind adolescents' identity style. *Journal of Youth and Adolescence*, 39, 1343-1356.
- Sorge, G.B., Skilling, T.A., & Toplak, M.E. (2015). Intelligence, executive functions, and decision making as predictors of antisocial behavior in an adolescent sample of justice-involved youth and a community comparison group. *Journal of Behavioral Decision Making*, 28, 477-490.
- Stattin, H. & Kerr, M. (2000). Parental monitoring: a reinterpretation. *Child Development*, 71(4), 1072-1085.
- Steinberg, L., Darling, N., & Fletcher, A. C. (1995). Authoritative parenting and adolescent adjustment: An ecological journey. In P. Moen, G. H. Elder, Jr., & K. Luscher (Eds.), *Examining lives in context: Perspectives on the ecology of human development* (pp. 423-466). Washington, DC: American Psychological Association.
- Stoolmiller, M. (1994). Antisocial behavior, delinquent peer association and unsupervised wandering for boys: Growth and change from childhood to early adolescence. *Multivariate Behavioral Research*, 29, 263-288.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4<sup>th</sup> ed.). Toronto: Allyn & Bacon.
- Thornberry, T.P., & Krohn, M.D. (2000). The self-report method for measuring delinquency and crime. *Measurement and analysis of crime and justice*, 4, 33-83.
- Vazsonyi, A.T., & Huang, L. (2010). Where self-control comes from: on the development of self-control and its relationship to deviance over time. *Developmental Psychology*, 46(1), 245-257.
- Vuchinich, S., Bank, L., & Patterson, G. R. (1992). Parenting, peers, and the stability of antisocial behavior in preadolescent boys. *Developmental Psychology*, 28(3), 510-521.
- Wei, C., & Kendall, P.C. (2014). Child perceived parenting behavior: Childhood anxiety and related symptoms. *Child & Family Behavior Therapy*, 36(1), 1-18.  
<http://doi.org/10.1080/07317107.2014.878175>
- West, S.G., Finch, J.F., & Curran, P.J. (1995). Structural equation models with nonnormal variables: Problems and remedies. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues and applications* (pp. 56-75). Thousand Oaks, CA: Sage.

- White, R.W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, 66(5), 297-333.
- Willoughby, T., & Hamza, C.A. (2011). A longitudinal examination of the bidirectional associations among perceived parenting behaviors, adolescent disclosure and problem behavior across the high school years. *Journal of Youth and Adolescence*, 40(4), 463-478.
- Wikström, P-O.H., Ceccato, V., Hardie, B., & Treiber, K. (2010). Activity fields and the dynamics of crime: Advancing knowledge about the role of the environment in crime causation. *Journal of Quantitative Criminology*, 26, 55-87.
- Yerkes, R.M., & Dodson, J.D. (1908). The relation of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology & Psychology*, 18, 459-482.

### CHAPTER 3

#### **Study 2: Indirect Effects involving Parenting, Affiliation, and Antisocial Behavior**

Affiliation is defined as individual differences in the desire for relational warmth and closeness, independent of shyness or extraversion (Putnam, Ellis, & Rothbart, 2001). Although affiliation overlaps with effortful control during infancy and early childhood, it emerges as a separate aspect of temperament in early adolescence (Evans & Rothbart, 2009; Nigg, 2006). Because affiliation involves concern for how one's behaviors might affect social relationships, it is an aspect of temperament that, on theoretical grounds and on the basis of some empirical evidence, should impact the degree to which adolescents are willing to engage in antisocial acts against other individuals (Ellis & Rothbart, 2001; Nigg, 2006; Zhang & Wang, 2012). Yet there is currently little research on this aspect of temperament in general, and how it relates to antisocial behavior specifically. Thus, the current study seeks to address this question in a longitudinal study of adolescents.

#### **Defining Affiliation as a Temperament Construct**

Temperament is defined as constitutional differences in reactivity and self-regulation in the domains of affect, activity, and attention (e.g., Rothbart & Derryberry, 1981; Rothbart & Rueda, 2005). Affiliativeness is a higher-order factor of temperament that consistently emerges in factor analyses in samples of children, adolescents, and adults. In both the Temperament in Middle Childhood Questionnaire (Simonds & Rothbart, 2004) and in the Early Adolescent Temperament Questionnaire – Revised (Ellis & Rothbart, 2001), affiliativeness is measured as the tendency to desire and find pleasure in warmth and closeness with others, independent of shyness or extraversion. In childhood, it is associated with the affiliation, perceptual sensitivity, and pleasure

sensitivity scales. In the Adult Temperament Questionnaire (Evans & Rothbart, 2007), the broad domain of affiliativeness is associated with the social closeness, emotional empathy, and empathic guilt scales, again distinct from the broad domain of extraversion/surgency which includes sociability, a related yet distinct concept.

Buss and Plomin (1975) offered a perspective of temperament in which they described four dimensions of personality, namely emotionality, activity, sociability, and impulsivity. As a temperament construct, sociability is developmentally specific in that it plays a role in mother-infant interactions and is part of adult extraversion. Even though sociability is related to affiliative behaviors, Evans and Rothbart (2007) distinguish the two terms in saying that “affiliativeness involves concern for others, whereas sociability refers to a preference for conversing, interacting, and approaching others” (p.871). Indeed, Buss and Plomin (1984) described sociability as “the tendency to prefer the presence of others to being alone” (p.63). From very early on in life, some individuals are more intrinsically motivated by social rewards (e.g., social interactions with other persons) and more upset by their deprivation. Zhang and Wang (2012) purport that sociability can be differentiated from temperamental affiliativeness in that it encompasses attachment to a wider range of social stimuli (e.g., sports teams, one’s ethnicity, etc.) than affiliativeness which is directly concerned with emotionally-laden social stimuli (e.g., friendship, trust, cooperation).

Nigg (2006) considers temperament traits such as affiliation within the higher-order context of approach (which he maps onto extraversion) and withdrawal (which he maps onto neuroticism). He notes that affiliation and empathy involve social approach and cooperation responses, and may be due to an individual’s sensitivity to negative



affect in other individuals. Approach and extraversion are typically associated with positive affect, and withdrawal is typically associated with negative affect. Affiliativeness is not so straightforward. Low affiliativeness tends to be related to aggression (Ellis & Rothbart, 2001) and externalizing problems, whereas high affiliativeness is sometimes related to depressive mood (Ellis & Rothbart, 2001) and internalizing problems (Rothbart, 2007). Based on these explanations, affiliation is characterized by individual differences with respect to social stimuli with emotional significance, whereas approach-withdrawal can be seen more globally to include responses to non-social stimuli as well.

There is a large amount of research concerning the link between adolescent antisocial behavior and affiliation with deviant peers (e.g., Henry, Tolan, & Gorman-Smith, 2001; Chung & Steinberg, 2006). However, affiliation as a temperament construct is related to, yet distinct from, specific instances of affiliation. In other words, affiliation is better understood as behavioral tendencies rather than specific instances of behaviors. At the same time, affiliative temperament can only be inferred from the presence and quality of concrete behaviors and emotions (e.g., attachment, cooperation, friendship, love, interpersonal trust) (Zhang et al., 2012). In summary, Zhang et al. (2012) offer a working definition for affiliativeness, as “a relatively stable prosocial tendency to want to be close to others” and to want to “form and sustain close contacts with others” (p.8987). In other words, affiliation is perhaps best defined as the desire for social closeness and, accordingly, should be related to interpersonal relationships and behaviors.

### **Affiliation and Antisocial Behavior**

Antisocial behaviors are characterized by an apparent lack of remorse or guilt, an inability to make or keep friends, a tendency to violate the boundaries and rights of

others, aggression, callousness and a lack of empathy (Blair, 2013). Neurocognitive research has shown that the biological basis for empathy, a necessary component of affiliation, is expressed early in life in the mirror neuron system in a process known as emotional contagion (Chakrabarti & Baron-Cohen, 2006; Rizzolatti & Craighero, 2004). In a theoretical paper based on a review of neurobiological research, Zhang and Wang (2012) outlined how structural and functional abnormalities in brain circuits which are related to affiliative temperament (e.g., the mirror neuron system, dopaminergic system, and neuropeptides including oxytocin and vasopressin) may contribute to antisocial behavior. They suggest that, across development, deficiency in the mirror neuron system, for instance, reduces one's ability to feel other people's emotional states despite intact capacity for cognitive empathy. This could provide a pathway by which affected individuals might aggress against other individuals without feeling remorse or guilt for their behaviors.

Nigg (2006) also described a pathway from low empathy/affiliation to instrumental aggression via a faltering capacity to feel others' emotional distress such as sadness, fear, and anxiety. In his review of conceptual issues relating temperament to psychopathology, Nigg (2006) named the opposite pole of affiliation as indifference/hostility, and suggested that low affiliation involves low empathy or an indifference to others' emotions. He theorized that instrumental aggression may be facilitated by low affiliation, in that individuals may pursue goal-directed behavior without regard for the harm that it causes others. Indeed, Gini, Pozzoli, and Bussey (2015) found that moral disengagement (tendency to morally disengage, make justifications and excuses for hurting others) was positively related to both instrumental

and reactive aggression in a sample of male and female adolescents aged 11 to 15 years old. Conversely, adolescents with high affiliation may be less likely to cause harm to other individuals because they are not only aware of others' emotions but they also want to achieve relational closeness with those individuals.

It follows then that impairment in affiliation is a core feature of antisocial behaviors. But there is currently little research concerning the link between these two constructs. Instead, previous research has focused more on the relation between the closely related personality trait, agreeableness, and problem behaviors. For instance, Kokkinos, Karagianni, and Voulgaridou (2017) found it to be inversely related to proactive and reactive physical and relational aggression. Agreeableness is one of five personality factors comprising the Five Factor Model of personality (Goldberg, 1990) and it involves six aspects: trust, straightforwardness, compliance, altruism, modesty, and tender-mindedness (Costa & McRae, 1992). In the six-factor HEXACO model of personality, Agreeableness is commonly related to forgiveness, tolerance, and a lack of anger (Lee & Ashton, 2012). Ashton and Lee (2001) have also discussed how agreeableness affects the likelihood of someone exploiting others versus treating them prosocially. For example, when someone cares for another person and cares for their welfare (as in the case of affiliative temperament), they may be motivated to act prosocially and refrain from acting antisocially toward them because of the intrinsic value they themselves receive.

Thus, further rationale for the proposed study is gained from the personality literature. Indeed, a meta-analysis of 59 studies concerning personality and antisocial behavior was conducted, and the authors found the average effect size for agreeableness

was largest compared to all other personality factors (Miller & Lynam, 2001). Then, in a community sample of 481 individuals, Miller, Lynam, and Leukefeld (2003) found that, when compared to neuroticism and conscientiousness, the facets from the dimension of agreeableness were most consistently related to the stability, variety and onset of conduct problems, as well as to aggression, and antisocial personality disorder symptoms.

To the extent that affiliation and agreeableness are similar, then, hypotheses for the current study are informed by the personality literature. Evans and Rothbart (2007) found that affiliativeness was highly correlated with Big-Five agreeableness in a community sample ( $r = .69$ ). However, with respect to the current outcome of interest, antisocial behavior, the correlation is stronger between NEO-PI agreeableness and aggressiveness than the correlation between ATQ affiliativeness and aggressiveness. The difference in the strength of the correlations could be because the Big-Five model agreeableness is a two-factor model of temperament that includes temperament plus a behavioral component (Evans & Rothbart, 2009).

More recent work by Farrell, Brook, Dane, Marini, and Volk (2015) has extended the relation between affiliation and personality using the HEXACO model, and has specifically found support of the relation between affiliation and agreeableness. Their work also shows, however, that affiliation in adolescence is a significant predictor of emotionality and that affiliation was more strongly linked with emotionality than with agreeableness. They suggest that the two traits, affiliation and emotionality, share characteristics of emotional connectedness such as empathy, grief, friendliness, and a desire for emotional closeness with others. Book, Volk, and Hosker (2012) found that emotionality was negatively related with bullying, and both instrumental and reactive

forms of aggression in a sample of 310 adolescents between the ages of 10 and 18 years old.

In this way, affiliative tendencies may affect self-regulation of antisocial behavior differently than effortful control. Effortful control influences the inhibition of impulses by promoting reflection about consequences prior to engaging in a behavior. In contrast, affiliativeness is likely to affect how much someone cares about the social consequences of their behavior, and thereby affects analyses of the social costs and benefits of antisocial behavior.

Yet, despite these theoretical implications, to date, affiliation is an area of temperament which, compared to other temperament traits, has been relatively understudied, especially in relation to antisocial behavior. In contrast, other aspects of temperament such as negative affect, including fearfulness, have been more widely studied, and effortful control has become a burgeoning subject of study in relation to antisocial behavior in more recent years (e.g., Veenstra et al., 2006; 2008). Therefore, in terms of empirical support directly linking affiliation with antisocial behavior, the research is limited.

There are, however, several studies which provide empirical support for the current study. For example, Ellis and Rothbart (2001) found affiliation to be negatively related to aggression in adolescents aged 10 to 16 years old, even when controlling for differences in gender. Similarly, in a sample of preadolescent children aged 10 to 11 years old, Ormel et al. (2005) found that affiliation was negatively related to externalizing problems, independent of internalizing problems.

The current study contributes to our knowledge of this topic by extending the sparse previous research using longitudinal analyses of affiliation in adolescence. It is critical to study the link between temperamental affiliation and antisocial behavior in adolescence because affiliation first emerges as a unique, independent temperament trait in this developmental period (Evans & Rothbart, 2009), and it is during this same period when antisocial behavior becomes more normative (Moffit, 1993).

### **Indirect Effects of Parenting on Antisocial Behavior through Affiliation**

Given the role that parents play in helping to shape their children's temperament (e.g., Belsky, Fish, & Isabella, 1991; Braungart-Rieker, Hill-Soderlund, & Karrass, 2010) and the large base of research that confirms a link between authoritative parenting and antisocial behavior, a further contribution of the current study is to examine possible indirect effects involving parenting, temperament, and antisocial behavior. While temperament, including affiliation, is assumed to have a genetic, biological basis, previous theory and research (e.g., attachment literature, life history perspective) suggest that parent-adolescent relationships play a key role in shaping a child's perception of, and interest in, social relationships (Del Giudice, 2009), as well as their social competence with peers (Allen, Moore, Kuperminc, & Bell, 1998). Therefore, it may be informative to consider whether parenting is indirectly related to adolescent antisocial behavior through its intermediate effect on adolescent affiliation.

The premise of the current study relies on individual differences in temperamental affiliation, in that parenting may relate to changes in affiliation over time which contribute to antisocial behavior. While there is little previous research specifically on affiliation, there is evidence of concurrent correlations between maternal knowledge (but

not tracking) and agreeableness and emotionality (Farrell et al., 2016). Also, Ormel et al. (2005) found that other temperament traits (frustration, fear, and effortful control) were associated longitudinally with parental externalizing and internalizing psychopathology, which in turn were associated with adolescent externalizing and internalizing psychopathology. However, affiliation was not linked with parental psychopathology. This may suggest that the former were more affected by genetic factors than affiliation.

Buss (2009), Hawley (2011), and Del Giudice and Belsky (2010) give accounts of why there may be individual differences in agreeableness (and affiliation, the temperament equivalent) beyond those predicted by biologically-based factors. For example, personality and temperament traits can change to adapt to difficult circumstances such as those signaled by a poor parent-child relationship. If an adolescent is in a situation where parenting is consistently poor, it may be temporarily adaptive for him or her to, in the context of that relationship, not seek emotional connectedness in his or her parents. In turn, a low desire for emotional attachment to others (known as callous-unemotional traits when accompanied by low fear) can lead to antisocial behaviors in adolescence (Rothbart, 2011), especially the instrumental type of aggression (Nigg, 2006).

This means that affiliation may be influenced by parenting, as the life-history perspective suggests that the quality of the parent-child relationship may predict the extent to which an adolescent desires emotional closeness (Del Giudice, 2009), or more specifically, may predict the child's attachment style. For example, when the quality of the parent-child relationship is poor or when parenting is not authoritative (e.g., low acceptance-involvement, low monitoring knowledge, high psychological control),

children are likely to develop an insecure attachment (Karavasilis, Doyle, & Markiewicz, 2003). Such early psychosocial stress and insecure attachment act as cues of environmental risk, which can lead to the adolescent devaluing relationships and prosocial, cooperative behavior, because there is a lack of trust in others. The individual expects that prosocial behaviors will be exploited rather than reciprocated, and consequently will not be beneficial. Instead he or she is more likely to engage in aggressive and risk-taking behavior as a way of coping (Del Giudice, 2009), including advantage taking, opportunism, coercion, and aggression. These strategies involve pursuing advantageous outcomes without regard for social consequences, given the lack of concern for social relationships. Under such circumstances, affiliation seems less likely to develop, while antisocial behaviors seem more likely to develop.

By way of contrast, adolescents who are raised in a warm, loving, and emotionally secure environment experience the emotional rewards associated with social connectedness and closeness and increasingly desire these types of relationships outside the home as well. In other words, authoritative parenting is positively related to secure attachment (Karavasilis, Doyle, & Markiewicz, 2003) and should help in the development of affiliation. Children experiencing this type of parenting should be more likely to value relationships because they trust others and expect help and support, so these relationships are generally beneficial to them. Indeed, securely attached children generally experience positive adjustment outcomes and healthy relationships with others in adolescence and adulthood, including less engagement in high risk behaviors and enhanced social skills and coping strategies (Moretti & Peled, 2004). Prosocial, as opposed to antisocial, behaviors tend to be associated with such affiliative characteristics.



In this way, parenting and affiliative-type motivations can be related to adolescent behaviors, whether prosocial or antisocial in nature.

Additionally, affiliative adolescents may wish to maintain relational closeness with their parents by not engaging in antisocial behaviors which can increase conflict or parental disappointment, as indeed, Klahr, Rueter, McGue, Iacono, and Burt (2011) found positive associations between parent-child conflict and adolescent delinquent behaviors. Instead, affiliative adolescents may display prosocial behaviors which strengthen relationships with others, including with their parents, thereby protecting themselves against engagement in antisocial behaviors in the future. To this end, Rothbart (2011) purported that affiliativeness and caring about others can protect against development of problems when parenting is poor. Similarly, Waller et al. (2016) found fearlessness and low interpersonal affiliation traits contribute to the development of early callous-unemotional behaviors, with the pathways buffered by positive parenting.

In summary, there is little direct evidence that speaks to the links between parenting and affiliation, and indirect evidence from related personality traits (agreeableness, emotionality, callous-unemotional traits) is limited and somewhat mixed. In light of the strong theoretical reasons for investigating indirect effects involving parenting, affiliation, and antisocial behavior (e.g., attachment theory, life history perspective), the purpose of the current study is to address this gap in the literature.

### **Indirect Effects of Affiliation on Parenting through Antisocial Behavior**

Previous research and theory about evocative effects of temperament on parenting suggest the possibility of bidirectional relations, particularly indirect effects of affiliation on parenting through antisocial behavior. In line with the theory and research that

supports a negative relation between affiliation and antisocial behavior, it is believed that antisocial behavior is likely to evoke less positive parenting. For example, Crouter, Bumpus, Davis, and McHale (2005) found that parental knowledge was lower when adolescents engaged in higher levels of risky behavior. In general, adverse child traits tend to evoke more negative parenting. For instance, Lengua and Kovacs (2005) showed that irritability evoked less consistent discipline. Thus, adolescent affiliation should theoretically be positively related to authoritative parenting, as the adolescent's desire for emotional warmth and closeness evokes positive aspects of parenting.

### **The Present Study**

In relation to the current study, which uses longitudinal data collected from male and female adolescents as well as their mothers, the indirect effects of parenting on antisocial behavior through affiliation, and the indirect effects of affiliation on parenting through antisocial behavior, are explored.

First, authoritative parenting at time 1 is expected to be positively related to affiliation at time 2 and negatively related to antisocial behavior at time 2, except for tracking which may be positively related to antisocial behavior (Stattin & Kerr, 2000). Second, considering research concerning empathy and agreeableness, affiliation is expected to be negatively related to antisocial behavior. In other words, low authoritative parenting is expected to predict low affiliation and greater antisocial behavior over time, and high authoritative parenting is expected to predict high affiliation and subsequently less antisocial behavior over time. Third, it is hypothesized that the parenting dimension of acceptance-involvement should have the strongest indirect relation of the parenting dimensions to adolescent antisocial behavior through its relation to adolescent affiliation,

because affiliation involves the desire for relational closeness which should be fostered by parental acceptance-involvement, which entails warmth and responsiveness.

Because of possible bidirectional associations between parenting and adolescent temperament and behavior, a second model examines whether adolescent affiliation is indirectly related to maternal parenting through antisocial behavior. Specifically, it is hypothesized that affiliation should have a positive direct and indirect effect on parenting, because of a negative longitudinal effect on antisocial behavior, which should be itself negatively related to authoritative parenting (i.e., more antisocial behavior should be related to poorer parenting, whereas less antisocial behavior should be related to more authoritative parenting). Because affiliation represents a desire for emotional closeness, and is displayed in adolescent warmth, it is expected to elicit positive parenting over time, above and beyond the stability effects of parenting. The proposed path models use a half-mediation design to analyze indirect effects from parenting to antisocial behavior through adolescent affiliation, and from adolescent affiliation to parenting through antisocial behavior.

### **Contributions of the Current Study**

The current study is intended to address the large gap in the literature concerning the longitudinal relations between parenting, temperament affiliation, and antisocial behavior in adolescence. At the time of this dissertation, there are a limited number of empirical studies that examine the relations between parenting and affiliation and affiliation and antisocial behavior (e.g., Snyder et al., 2015), and none that explore the indirect effects of parenting on antisocial behavior through adolescent affiliation, nor of adolescent affiliation on parenting through antisocial behavior.

## Method

### Participants

Data for Study 2 were obtained from a larger dataset ( $N = 1179$ ) that was collected for a research initiative which focused on youth gambling and related risk factors (Dane, McPhee, Root, & Derevensky, 2004). Analyses for the proposed study will be based on a community sample of adolescents ( $N = 521$ , 55% female) ranging in age from 10 to 15 years old ( $M_{\text{age}} = 12.95$  years,  $SD = 1.60$ ) at the time of the first survey completion and between the ages of 11 and 17 at time 2. Most adolescent participants (95%) lived with their mother; 73% lived with both parents at the time of the first assessment, and 22% lived with their mother in some other type of family arrangement (mother only, mother and step-father, mother and partner). Because of the preponderance of children living with their mothers, and because of the near complete data collected from mothers (97%), the data collected from fathers were not included in this study.

Many of the mother participants (77%) indicated their families were Canadian in ethnicity and culture, and 23% indicated their families belonged to a different ethnicity or culture. Most were citizens of the United States (2.2%) or identified with various European countries (14.9%). Very few indicated Asian (1.2%), Aboriginal (0.6%), and African (0.2%) descent. The modal response (accounting for approximately 15% of families) for household income before taxes in the previous year was \$50,000-\$60,000; 30% fell below this income level, and 55% were above this income level.

### Procedure

Adolescent participants and their parents responded to questionnaires at two times with a span of approximately 18 months between each assessment. Participants were

recruited from the community through random digit dialing, and survey packages were mailed out and mailed back to the investigators. Participants were given \$20 for their participation. Data concerning temperament (i.e., affiliation) were collected from mothers and their adolescent children, and combined into a composite variable that reflects mother and adolescent perspectives. Data concerning authoritative parenting were also collected from both mothers and their adolescent children, yet were kept separate according to informant because of the theoretical importance of differences in perspectives. Data concerning antisocial behavior were collected using self-report.

### **Missing Data**

See Chapter 2 (Study 1) for a description of the missing values analysis. In this case, Little's MCAR test included gender as a categorical variable (i.e., male or female), parenting dimensions, affiliation, and antisocial behavior at waves 1 and 2, and age as continuous variables. The chi square result was nonsignificant, which meant failure to reject the null hypothesis, thereby suggesting that data were not missing for systematic reasons.

As in Study 1, an independent samples *t*-test was used, in this case, to compare the means of wave 1 parenting, affiliation, and antisocial behavior of those participants from wave 1 ( $N = 521$ ) who continued in the study ( $n = 254$ ) to those who discontinued ( $n = 267$ ). There were no significant differences found between the two groups for psychological autonomy granting, acceptance-involvement, knowledge, tracking, or limit setting. As well, there were no significant differences found between those who continued and those who discontinued for affiliation or antisocial behavior. These results suggest that there is no relationship between the missingness of the data and the data, and

that common methods for handling missing data can be used. Thus, expectation-maximization was used to allow for the use of the bootstrapping method in testing indirect effects.

## Measures

The study's measures are described below. Refer to Table 3.1 for additional information about descriptive statistics.

**Demographic information.** Adolescents reported information at Time 1 regarding their *age* in years, their *gender* whether male or female, and who they lived with the most (e.g., mother and father, etc.). Household income was reported by mothers but was not included in the analyses.

**Authoritative parenting.** Authoritative parenting was rated by adolescents and mothers at both waves using the Authoritative Parenting measure (Gray & Steinberg, 1999) which includes three subscales, psychological autonomy granting, acceptance-involvement, and monitoring knowledge. The parent version included the same subscales and similar items as the adolescent version but it was worded to reflect how mothers perceived their own parenting behaviors. A scale measuring self-disclosure (Stattin & Kerr, 2000) was also included in the questionnaire package for youth but not their mothers.

***Psychological autonomy granting.*** The psychological autonomy granting subscale measures the extent to which adolescents perceive that their mother employs non-coercive, democratic discipline and encourages the adolescent to express individuality within the family. A sample item is "She lets me make my own plans for things I want to do." Adolescents indicate on a 4-point scale the extent to which they

agree with the items. The other items that comprise this subscale were reverse coded so that high scores reflect high levels of psychological autonomy granting. Internal consistency for this 9-item subscale was good (Time 1  $\alpha = .72$ , Time 2  $\alpha = .73$ ), and based on mother report, the alpha coefficients for time 1 and 2 were .68 and .67 respectively.

***Acceptance-involvement.*** For the adolescent version, the acceptance-involvement subscale measures the extent to which adolescents perceive their mother as loving, responsive, and involved. A sample item is “She helps me with my schoolwork if there is something I don’t understand” to which adolescents may indicate that they (1) strongly disagree, (2) disagree somewhat, (3) agree somewhat, or (4) strongly agree. There are 9 items in this subscale, and the internal consistency was good (Time 1  $\alpha = .80$ , Time 2  $\alpha = .79$ ). Reliability at time 1 for mother-reported acceptance-involvement was .64, and .64 at time 2.

***Monitoring knowledge.*** The supervision and strictness subscale consists of items that measure the extent to which adolescents perceive their mothers as being knowledgeable about how they spend their time outside of school and with peers, and the extent to which mothers ask their adolescent children about how they spend their time outside of school and with peers. Curfew is also part of this subscale and is a measure of limit setting.

***Knowledge.*** A sample item is “How much does your mother really know what you do with your free time?” Respondents could indicate that (1) she never knows, (2) she sometimes knows, (3) she usually knows, or (4) she always knows. Reliability for

adolescent-reported knowledge was good at time 1 ( $\alpha = .83$ ) and time 2 ( $\alpha = .80$ ), and it was good for mother-reported knowledge (Time 1  $\alpha = .79$ , Time 2  $\alpha = .80$ ).

Because of research that suggests that knowledge is largely influenced by adolescent self-disclosure, for adolescent-reported parenting, self-disclosure was combined with parental knowledge. The self-disclosure scale (Stattin & Kerr, 2000) included five items concerning the extent to which adolescents spontaneously tell their parents about their friends, keep secrets or hide from their parents what they do during free time, evenings, and weekends, and how much they want to tell or like to tell their parents about school and their unsupervised activities. Only adolescents, and not mothers, were given these items. Responses were given on a five-point scale ranging from “almost never” to “very often.” Self-disclosure had good reliability as well (Time 1  $\alpha = .79$ , Time 2  $\alpha = .82$ ). When combined with knowledge, reliability was .84 at time 1 and .87 at time 2.

*Tracking.* The solicitation or tracking items measured how much mothers tried to know various details of their children’s friendships, activities, and whereabouts. Internal consistency of this subscale was good for adolescent (Time 1  $\alpha = .84$ , Time 2  $\alpha = .78$ ) and mother (Time 1  $\alpha = .83$ , Time 2  $\alpha = .70$ ) reports.

*Limit setting.* Finally, limit setting was measured by asking adolescents and their mothers the time of the adolescent’s curfew on weekdays and weekends. Internal consistency values at time 1 was .78 for adolescents and .79 for mothers. At time 2, reliability was .84 for adolescents and .81 for mothers.

**Affiliation.** At two different times, adolescents responded to the Early Adolescent Temperament Questionnaire – Revised (EATQ-R; Ellis & Rothbart, 2001) which



includes five items that comprise the Affiliation subscale (see Appendix C for a list of the items). An example item is: “It is important to me to have close relationships with other people.” For each item, adolescents indicated how true the statement was of themselves on a Likert scale, ranging from (1) “almost always untrue” to (5) “almost always true”. Inter-item reliabilities for the adolescent affiliation scale were at wave 1 ( $\alpha = .65$ ), and wave 2 ( $\alpha = .61$ ). The Affiliation subscale therefore reflects the extent to which adolescents want to be emotionally close to others through communication, physical touch, and helping, and the extent to which they view themselves as being warm and friendly.

Mothers reported their child’s affiliation using six items from the Early Adolescent Temperament Questionnaire – Parent Report (see Appendix C for a list of the mother-reported affiliation items). They indicated how true the statement was of their adolescent child on a 5-point scale in which high scores reflected greater affiliation. An example item is: “My child would like to be able to spend time with a good friend every day.” Inter-item reliability for the mother-report of adolescent affiliation was at wave 1 ( $\alpha = .61$ ), and wave 2 ( $\alpha = .67$ ). A composite measure of affiliation was created by averaging the mother and adolescent reports of affiliation, and the reliability was .68 at time 1 and time 2. These somewhat lower alpha levels are consistent with previous research. Ormel et al. (2005) reported an alpha of .66.

**Adolescent antisocial behavior.** The Self-Reported Delinquency Questionnaire (SRDQ; Le Blanc & Fréchette, 1989) was used to measure the frequency with which adolescents were involved in antisocial behavior according to their own report. Parent reports of antisocial behavior can be confounded by parental knowledge of their

adolescents' behavior and activities. The measure contains nineteen items that tap antisocial behaviors of differing kinds and degrees of severity, but it is important to note that scores from this measure are not meant to reflect overall seriousness or variety. At time 1 the overall scale reliability was .80, and at time 2 the reliability was .92. The scale includes three subscales, violence, theft, and vandalism.

The Violence subscale is comprised of seven items that indicate how often adolescents participated in overt (i.e., aggressive, confrontational) forms of antisocial behavior in the past year. A sample item from the Violence subscale is "In the past year, how often have you used a weapon (stick, knife, gun, rocks) in fighting with someone else?" The Theft and Vandalism subscales, comprised of eight and four items respectively, indicate how often adolescents participated in covert (i.e., non-aggressive, concealed) forms of antisocial behavior in the past year. A sample question from the Theft subscale is "In the past year, how often have you taken and kept something from a store without paying?" A sample question from the Vandalism subscale is "In the past year, how often have you purposely broken or destroyed something belonging to your parents or another family member?" Adolescents could indicate (1) never, (2) once or twice, (3) several times, or (4) quite often. Because the distribution of the antisocial behavior variable was highly skewed and kurtotic, a transformation of the data was applied to improve the normality of its distribution.

**Table 3.1***Means and Standard Deviations of Study Variables and Inter-rater Correlations*

<b>Variable</b>	<b>Mother</b>		<b>Adolescent</b>		<b><i>r</i></b>
	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>M</i></b>	<b><i>SD</i></b>	
Gender (female)			55%		
Age (years)			12.95	1.60	
Psychological Autonomy Granting-1	3.00	.41	2.79	.53	.40**
Psychological Autonomy Granting-2	3.06	.39	2.83	.53	.41**
Acceptance-Involvement-1	3.66	.28	3.40	.47	.30**
Acceptance-Involvement-2	3.63	.27	3.31	.47	.41**
Knowledge-1	3.78	.37	3.30	.62	.28**
Knowledge-2	3.69	.40	3.38	.62	.42**
Tracking-1	3.80	.50	2.95	.99	.20**
Tracking-2	3.80	.39	3.08	.85	.18**
Limit Setting-1	4.56	1.12	4.28	1.33	.67**
Limit Setting-2	3.87	1.17	3.57	1.35	.84**
Affiliation-1 (combined)			3.83	.51	
Affiliation-2 (combined)			3.82	.40	
Antisocial Behavior-1	-	-	1.14	.21	
Antisocial Behavior-2	-	-	1.20	.31	

*Note.* Means, standard deviations, and correlations were calculated using SPSS 22. Numbers 1 and 2 refer to assessments at times 1 and 2. Parenting scale ranged from 1-4 but limit-setting subscale ranged from 1-7. Adolescent report of knowledge included self-disclosure. Temperament (affiliation) scale ranged from 1-5 and is the combined (averaged) score of mother and adolescent report. Antisocial behavior scale ranged from 1-4 and used adolescent report only. \*\*  $p < .01$

## Plan of Analyses

All statistical analyses were performed using SPSS Statistics 22 and SPSS Amos 22. The mean variables were computed for the parenting dimensions, affiliation, and self-reported adolescent antisocial behavior scores for which there were at least 50% of the data present in any given variable by summing and averaging the values provided. Global fit indices were used to evaluate the goodness-of-fit for each model. Specifically, root mean square error of approximation (RMSEA) and the comparative fit index (CFI) were reviewed. Taken together, a RMSEA value less than .06 and a CFI value greater than .95 were considered to suggest good model fit (Hu & Bentler, 1999).

**Parent-led model.** To test whether there is a longitudinal, indirect effect of parenting on antisocial behavior through adolescent affiliation, a series of path analyses were conducted in which Time 1 correlations between study variables and autoregressive paths of affiliation and antisocial behavior were estimated (Bollen & Curran, 2006). The direct relations between each of the five parenting dimensions at Time 1 with affiliation and antisocial behavior at Time 2 were estimated simultaneously. The indirect path from the parenting variables at time 1 to antisocial behavior at time 2 through affiliation at time 2 was also analyzed. These analyses were conducted separately for mother and adolescent reports of parenting to observe potential similarities and differences in the results as a function of the informants' unique perspectives. Thus, separate variables were created for mother and adolescent reports of maternal parenting for each of the parenting dimensions. These types of analyses can show the extent to which parenting predicts adolescent affiliation and antisocial behavior over time, and possible indirect effects, above and beyond the stability effects of the mediator and outcome variables.

**Adolescent-led model.** A second model testing the possibility of an indirect effect between affiliation and parenting through antisocial behavior was conducted. Specifically, Time 1 correlations between study variables and autoregressive paths of antisocial behavior and each of the parenting dimensions were estimated (Bollen & Curran, 2006). The direct relations between affiliation at Time 1 with antisocial behavior and each of the five parenting dimensions at Time 2 were estimated simultaneously. The indirect paths from affiliation at time 1 to the parenting dimensions at time 2 through antisocial behavior at time 2 were also analyzed. Age was included in the analyses as a covariate, by drawing covariances with the Time 1 variables, and a single-headed arrow to the Time 2 antisocial behavior, and covariances with the error terms of the Time 2 variables. Gender was used as a moderator to see whether there were significant gender differences in the over-time regression paths.

## **Results**

### **Preliminary Analyses**

**Assumptions.** The assumption of normality and the possibility of outlying values were assessed by examining the appropriate skewness and kurtosis statistics, standardized scores, and histograms for each variable. See Study 1 for more information regarding the distribution of antisocial behavior and the transformation applied to normalize the distribution.

Parenting, affiliation, and antisocial behavior are generally correlated. The zero-order correlations between the key study variables are shown in Tables 3.2 and 3.3. Of the correlations between the parenting variables, knowledge and acceptance-involvement were the most strongly correlated. Of the correlations between the parenting variables

and affiliation, acceptance-involvement, parental knowledge, tracking, and limit setting were generally positively correlated with affiliation according to both mother and adolescent reports of parenting. Adolescent-reported psychological autonomy granting was not significantly correlated with affiliation, and one coefficient for mother-reported psychological autonomy granting was significant and positive. Acceptance-involvement according to mother report, and parental knowledge according to adolescent report, were the parenting dimensions that were most strongly correlated with affiliation. Except for some non-significant zero-order correlations between time 1 tracking and time 2 psychological autonomy granting with antisocial behavior, each of the parenting dimensions according to mothers' and adolescents' reports of parenting were negatively related to antisocial behavior. Parental knowledge and limit setting were the most closely associated of the parenting variables with antisocial behavior. Importantly, the zero-order correlations between affiliation and antisocial behavior were negative and significant. Because of these correlations, in estimating the path diagrams, the within-time correlations for the exogenous variables and the error terms for the endogenous variables were assumed to covary.

**Differentiated and composite variables.** Exploratory factor analyses were conducted in SPSS version 24 using the psychological autonomy granting, acceptance-involvement, knowledge, tracking, self-disclosure, and limit setting items based on wave 1 adolescent-reported parenting, and wave 1 mother-reported parenting which did not include self-disclosure items. See Study 1 for a description of the results which led to the decision to use a differentiated, five-factor model of parenting.

**Temperament composite.** Correlational analyses of adolescent and mother reports of affiliation found that they were significantly correlated at both waves albeit to a small-moderate degree (Time 1  $r = .27$ , Time 2  $r = .24$ ). *T*-tests were used to compare the means of mother and adolescent reports at both waves, and results showed a non-significant difference in means between mother and adolescent reports at both waves. Combining the variables also helps by reducing the problem of shared method variance, and minimizes bias from any one source. Thus, for the current study, affiliation scores are considered as a composite variable of mother and adolescent report.

**Gender differences.** With respect to possible gender differences for affiliation, girls on average score higher than boys (Ellis & Rothbart, 2001). In the current sample, an independent samples *t*-test of means at wave one found that girls ( $M = 3.97$ ,  $SD = .48$ ) had higher affiliation scores than boys ( $M = 3.66$ ,  $SD = .50$ ), and that the difference was statistically significant ( $t(519) = -7.09$ ,  $p < .001$ ). The difference was similarly significant when comparing the means at wave two. Therefore, gender was used as a moderator to examine whether gender differences in affiliation may have affected the results of the main analyses.

**Table 3.2***Correlations among Key Study Variables across Two Waves of the Study – Adolescent-Reported Parenting*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. PAG-1	---															
2. PAG-2	.64**	---														
3. AI-1	.24**	.24**	---													
4. AI-2	.25**	.34**	.70**	---												
5. Know-1	.25**	.10*	.56**	.40**	---											
6. Know-2	.15**	.18**	.50**	.60**	.61**	---										
7. Track-1	-.02	-.03	.29**	.27**	.25**	.18**	---									
8. Track-2	.04	-.01	.25**	.29**	.26**	.39**	.51**	---								
9. LS-1	.07	-.06	.21**	.12**	.28**	.25**	.01	.07	---							
10. LS-2	.07	.00	.27**	.29**	.32**	.34**	-.00	.08	.74**	---						
11. AFF-1	.04	.06	.17**	.19**	.21**	.26**	.10*	.18**	.09*	.11*	---					
12. AFF-2	-.02	-.01	.06	.15**	.06	.17**	.05	.15**	-.08	-.06	.71**	---				
13. AB-1	-.19**	-.11*	-.24**	-.20**	-.48**	-.42**	-.05	-.16**	-.28**	-.20**	-.12**	-.01	---			
14. AB-2	-.14**	-.13**	-.26**	-.28**	-.46**	-.54**	-.07	-.21**	-.35**	-.30**	.00	.07	.65**	---		
15. Age	-.12**	-.06	-.17**	-.20**	-.21**	-.22**	.10*	.08	-.55**	-.70**	-.13**	-.10*	.24**	.22**	---	
16. Gender	.01	.08	-.04	-.01	.16**	.15**	.08	.09*	.07	.03	.30**	.21**	-.19**	-.13**	-.04	---

*Note.* Correlations were calculated using SPSS Statistics 22. PAG refers to psychological autonomy granting. AI refers to acceptance-involvement. Know refers to parental knowledge. Track refers to tracking. LS refers to limit setting. AFF refers to affiliation. AB refers to antisocial behavior. 1 and 2 refers to times of measurement. \*\*= $p < .01$ , \*= $p < .05$ .



**Table 3.3***Correlations among Key Study Variables across Two Waves of the Study – Mother-Reported Parenting*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. PAG-1	---															
2. PAG-2	.77**	---														
3. AI-1	.10*	-.01	---													
4. AI-2	.08	.03	.63**	---												
5. Know-1	.13**	.07	.30**	.41**	---											
6. Know-2	.13**	.14**	.35**	.54**	.62**	---										
7. Track-1	-.11**	-.13**	.15**	.16**	.30**	.02	---									
8. Track-2	-.11*	-.08	.16**	.31**	.27**	.45**	.23**	---								
9. LS-1	.07	.09*	.05	.09	.17**	.34**	-.12**	.19**	---							
10. LS-2	.03	.06	.12**	.23**	.35**	.46**	.01	.25**	.74**	---						
11. AFF-1	.08	.17**	.18**	.21**	.09*	.26**	.04	.23**	.09*	.11*	---					
12. AFF-2	-.06	.03	.16**	.22**	-.01	.17**	.03	.21**	-.02	-.07	.71**	---				
13. AB-1	-.11*	-.07	-.17**	-.15**	-.27**	-.39**	.01	-.10*	-.26**	-.25**	-.12**	-.01	---			
14. AB-2	-.10*	-.05	-.11*	-.20**	-.28**	-.40**	.03	-.09*	-.25**	-.28**	.00	.07	.65**	---		
15. Age	-.04	-.10*	-.04	-.15**	-.16**	-.39**	.10*	-.16**	-.59**	-.74**	-.13**	.07	.24**	.22**	---	
16. Gender	.01	.11*	-.02	.05	.12**	.12**	.11*	.08	.04	.03	.30**	.29**	-.19**	-.13**	-.04	---

*Note.* Correlations were calculated using SPSS Statistics 22. PAG refers to psychological autonomy granting. AI refers to acceptance-involvement. Know refers to knowledge. Track refers to tracking. LS refers to limit setting. AFF refers to affiliation. AB refers to antisocial behavior. 1 and 2 refers to times 1 and 2 of measurement. \*\*= $p < .01$ , \*= $p < .05$ .

## Main Analyses

Results for the hypothesized and alternate models are described first according to adolescent-reported parenting, and then according to mother-reported parenting.

**Hypothesized model using adolescent report of parenting.** Figure 3.1 shows the specified path diagram including significant autoregressive and cross-lagged paths, and squared multiple correlations. According to the model fit indices, the model fit the data very well (CFI = 1.000; RMSEA = .000, 90% CI = .000-.046). In this model, the covariate age did not predict antisocial behavior over time. Both stability paths were significant suggesting that affiliation and antisocial behavior were highly stable between the two points of assessment. The standardized betas suggested that affiliation was more stable over time than antisocial behavior ( $\beta = .738$  and  $\beta = .534$ , respectively).

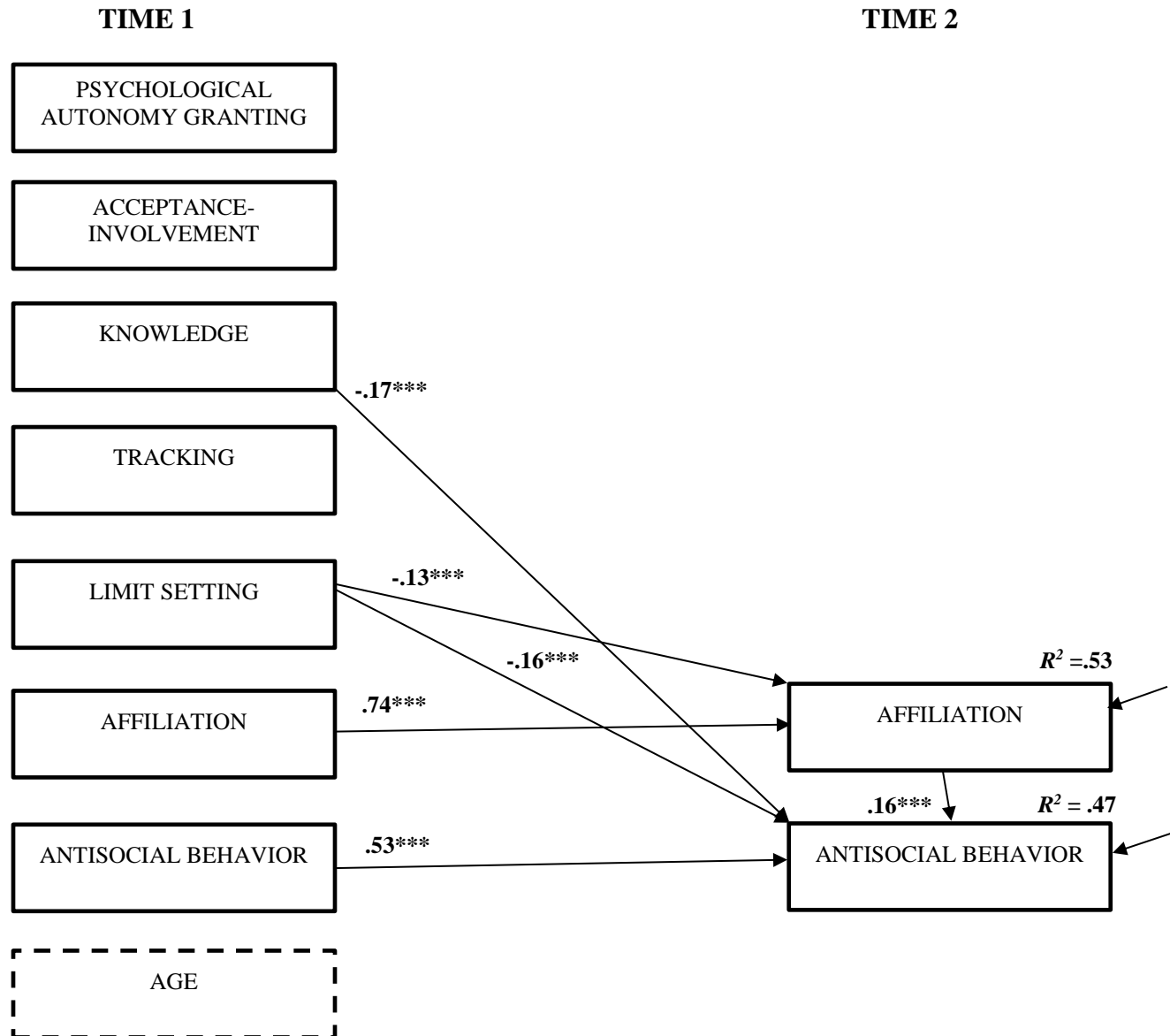
Several predicted paths were also significant. In support of the hypotheses that parenting directly predicts antisocial behavior, limit setting at time 1 had a direct negative effect on antisocial behavior at time 2, accounting for time 1 antisocial behavior ( $\beta = -.155, p < .001$ ). Parental knowledge also had a significant negative effect directly on antisocial behavior ( $\beta = -.169, p < .001$ ). These relations were independent of time 2 affiliation. The effects of psychological autonomy granting, acceptance-involvement, and tracking on antisocial behavior over time were non-significant when accounting for initial levels of antisocial behavior.

With respect to the over-time effects of authoritative parenting on adolescent affiliation, limit setting was negatively related to affiliation ( $\beta = -.130, p < .001$ ). The remaining parenting dimensions were not related to affiliation over time, after controlling for the effects of time 1 affiliation.

Also, contrary to hypotheses, even though affiliation at time 2 was related to antisocial behavior at time 2, the direction of the effect was unexpected. The zero-order correlation between affiliation and antisocial behavior at time 1 was negative ( $r = -.12, p < .01$ ), yet at time 2, affiliation positively related to antisocial behavior ( $\beta = .160, p < .001$ ). The correlations at time 1 suggested that affiliation would predict less antisocial behavior, and that the parenting dimensions, with the exception of maybe psychological autonomy granting for which the correlation was non-significant using adolescent-reported parenting, would positively predict affiliation over time.

In terms of the indirect effects which were examined, there was a significant negative relation between limit setting and antisocial behavior through affiliation ( $\beta = -.155, p < .01$ ), so that more limit setting at time 1 related to less affiliation at time 2 which was related to lower levels of antisocial behavior.

**Gender as a moderator.** Also, the chi square difference test between the unconstrained and constrained models (where regression weights were constrained to be equal for male and female groups) was non-significant indicating that gender did not moderate the paths between time 1 parenting and time 2 affiliation and antisocial behavior,  $\chi^2_{\text{diff}}(28) = 21.93, p > .05$ .



**Figure 3.1.** Diagram of significant paths and squared correlations for hypothesized model based on adolescent-reported parenting

*Note.* Values indicate standardized beta weights. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . The covariate is indicated by a dashed rectangle, and was allowed to covary with the time 1 variables (double-headed arrows not pictured here), and a single-headed arrow was drawn to time 2 Antisocial Behavior but the path was non-significant. Error terms at time 2 were allowed to covary (double-headed arrow not pictured here).

**Hypothesized model using mother-reported parenting.** Figure 3.2 shows the specified path diagram and the significant autoregressive and cross-lagged paths, as well as the squared multiple correlations. The fit indices for the hypothesized model based on mother-reported parenting suggested that the model fit the data well (CFI = .998; RMSEA = .039, 90%CI = .000-.074). Results from this analysis showed a high autoregressive path between affiliation at time 1 and time 2 ( $\beta = .723, p < .001$ ), and between antisocial behavior at time 1 and time 2 ( $\beta = .604, p < .001$ ). The covariate, age at time 1, did not significantly relate to changes in antisocial behavior at time 2.

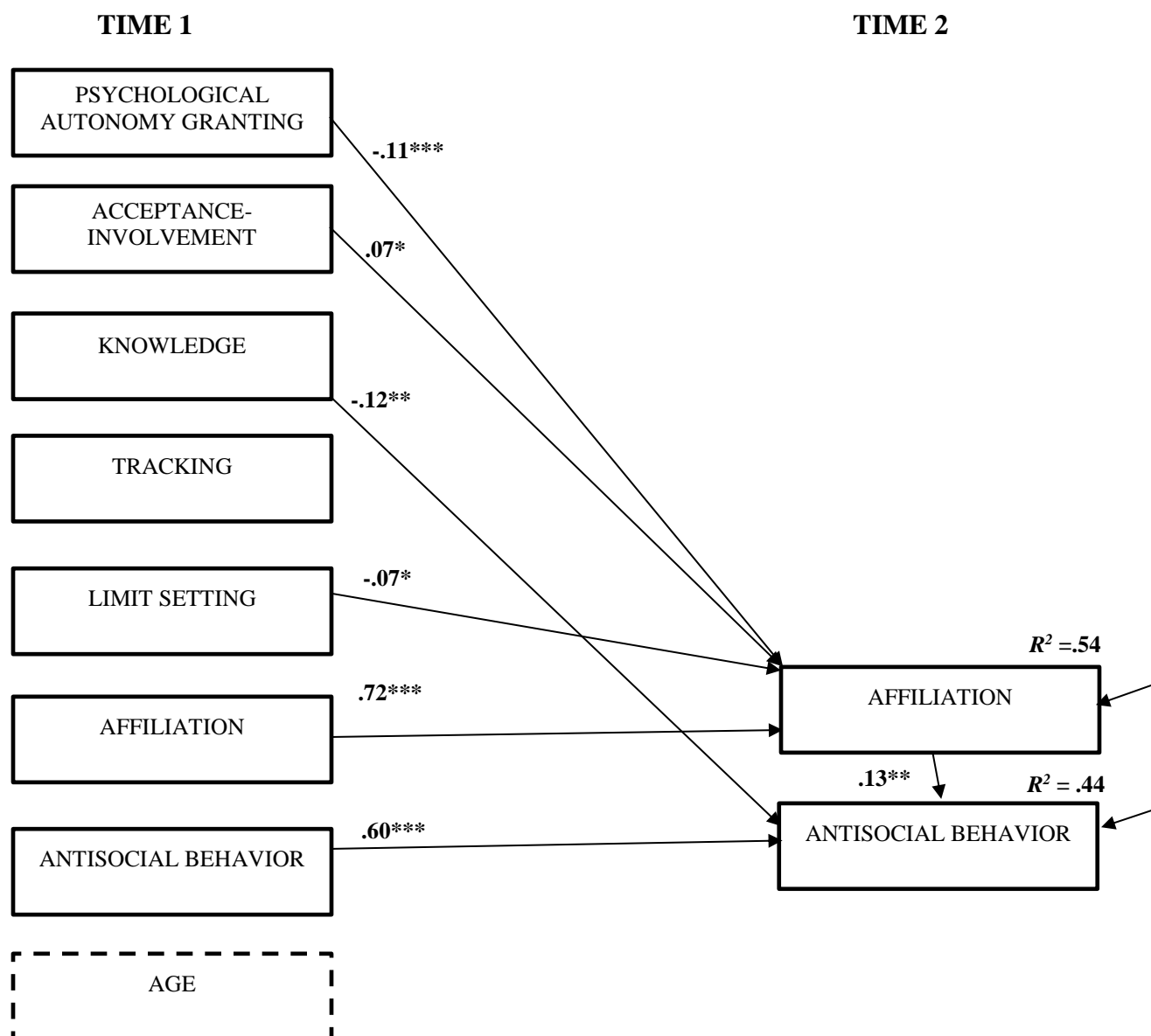
In terms of direct effects between parenting and antisocial behavior over time, parental knowledge was the only significant predictor when accounting for initial levels of antisocial behavior and controlling for time 2 affiliation ( $\beta = -.119, p < .01$ ). According to mother report of time 1 parenting, psychological autonomy granting, acceptance-involvement, tracking, and limit setting were not significant predictors of time 2 antisocial behavior.

Based on mother-reported parenting, there was evidence supporting the hypothesis that acceptance-involvement would lead to increases in adolescent affiliation over time. Time 1 acceptance-involvement predicted time 2 affiliation accounting for time 1 affiliation ( $\beta = .069, p < .05$ ). However, both psychological autonomy granting and limit setting were negatively related to affiliation ( $\beta = -.112, p < .001$ , and  $\beta = -.069, p < .05$ , respectively), and knowledge and tracking were not related to affiliation over time. As was the case in the adolescent model, time 2 affiliation was positively related to time 2 antisocial behavior ( $\beta = .125, p < .01$ ).

Indirect effects were found for each of the mother-reported parenting dimensions except for tracking. First, psychological autonomy granting was negatively related to antisocial behavior over time through affiliation ( $\beta = -.014, p < .01$ ), in that more psychological autonomy granting at time 1 predicted less affiliation at time 2 which related to less antisocial behavior. The indirect relation between knowledge and antisocial behavior through affiliation was also negative ( $\beta = -.008, p < .05$ ), so that more knowledge at time 1 predicted less affiliation at time 2 which related to less antisocial behavior. However, given that knowledge was not directly related to affiliation (it only approached significance), this indirect effect should be interpreted with caution. It is likely driven primarily by the larger affiliation to antisocial behavior effect. Limit setting was also negatively indirectly linked with antisocial behavior over time through affiliation ( $\beta = -.009, p < .05$ ), so that more limit setting (i.e., earlier curfew) at time 1 predicted less affiliation at time 2 which related to less antisocial behavior.

Contrary to hypotheses, acceptance-involvement was positively linked with antisocial behavior over time through affiliation ( $\beta = .009, p < .05$ ). In other words, higher acceptance-involvement at time 1 related to an increase in adolescent affiliation at time 2, which related to more antisocial behavior.

**Gender as a moderator.** There was a non-significant chi square difference test of the unconstrained model and the model in which the regression paths were constrained to be equal for the male and female groups, ( $\chi^2_{\text{diff}}(28) = 12.84, p > .05$ ), thus indicating that the regression paths were similar for both groups. Gender did not moderate the pattern of over-time relations between authoritative parenting, affiliation, and antisocial behavior.



**Figure 3.2.** Diagram of significant paths and squared correlations for hypothesized model based on mother-reported parenting

*Note.* Values indicate standardized beta weights. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . The covariate is indicated by a dashed rectangle, and was allowed to covary with the time 1 variables (double-headed arrows not pictured here), and a single-headed arrow was drawn to time 2 Antisocial Behavior but the path was non-significant. Error terms at time 2 were allowed to covary (double-headed arrow not pictured here).

**Table 3.4**

*Summary table of standardized beta coefficients, standard errors, and probability levels of direct effects for hypothesized models based on mother and adolescent reports of parenting*

Path	Mother			Adolescent		
	$\beta$	<i>SE</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>p</i>
PAG1→AFF2	-.112	.030	<.001	-.031	.024	.328
PAG1→AB2	.000	.013	.999	.014	.010	.684
AI1→AFF2	.069	.047	.032	-.002	.032	.953
AI1→AB2	.009	.021	.805	-.019	.014	.642
Know1→AFF2	-.063	.037	.061	-.047	.027	.217
Know1→AB2	-.119	.016	.002	-.169	.012	<.001
Track1→AFF2	-.016	.026	.630	-.008	.013	.794
Track1→AB2	.040	.011	.268	.000	.006	.992
LS1→AFF2	-.069	.011	.027	-.130	.010	<.001
LS1→AB2	-.058	.006	.161	-.155	.005	<.001
AFF1→AFF2	.723	.024	<.001	.738	.024	<.001
AFF2→AB2	.125	.018	.006	.160	.018	<.001
AB1→AB2	.604	.036	<.001	.534	.037	<.001

*Note.* PAG = psychological autonomy granting, AI = acceptance-involvement, Know = knowledge, Track = tracking, LS = limit setting, AFF = affiliation, AB = antisocial behavior. 1 and 2 refer to the two times of measurement.



### Alternate analyses

Two alternate analyses which modeled the indirect relation between affiliation and authoritative parenting through adolescent antisocial behavior were examined. The autoregressive paths for antisocial behavior, and each of the parenting dimensions were also estimated, and age was included as a covariate as in the parent-led model. The first alternate model is based on adolescent-reported parenting, and the second is based on mother-reported parenting.

**Alternate model using adolescent report.** The path diagram for this model is shown in Figure 3.3. Model fit indices suggested good fit of the model to the data (CFI = .955, RMSEA = .060, 90% CI = .054-.067). In this model, the autoregressive effects of the mediator (antisocial behavior) and outcome variables (parenting dimensions) were all significant and positive. Limit setting, psychological autonomy granting, and acceptance-involvement showed the greatest stability over time, while tracking and parental knowledge showed moderate stability. The direct relations between affiliation at time 1 and the parenting dimensions at time 2 were estimated. Above and beyond the effects of time 1 parenting, affiliation did not predict psychological autonomy granting or limit setting over time, but it did positively predict acceptance-involvement ( $\beta = .097$ ,  $SE = .025$ ,  $p < .001$ ), parental knowledge ( $\beta = .174$ ,  $SE = .031$ ,  $p < .001$ ), and tracking ( $\beta = .136$ ,  $SE = .047$ ,  $p < .001$ ).

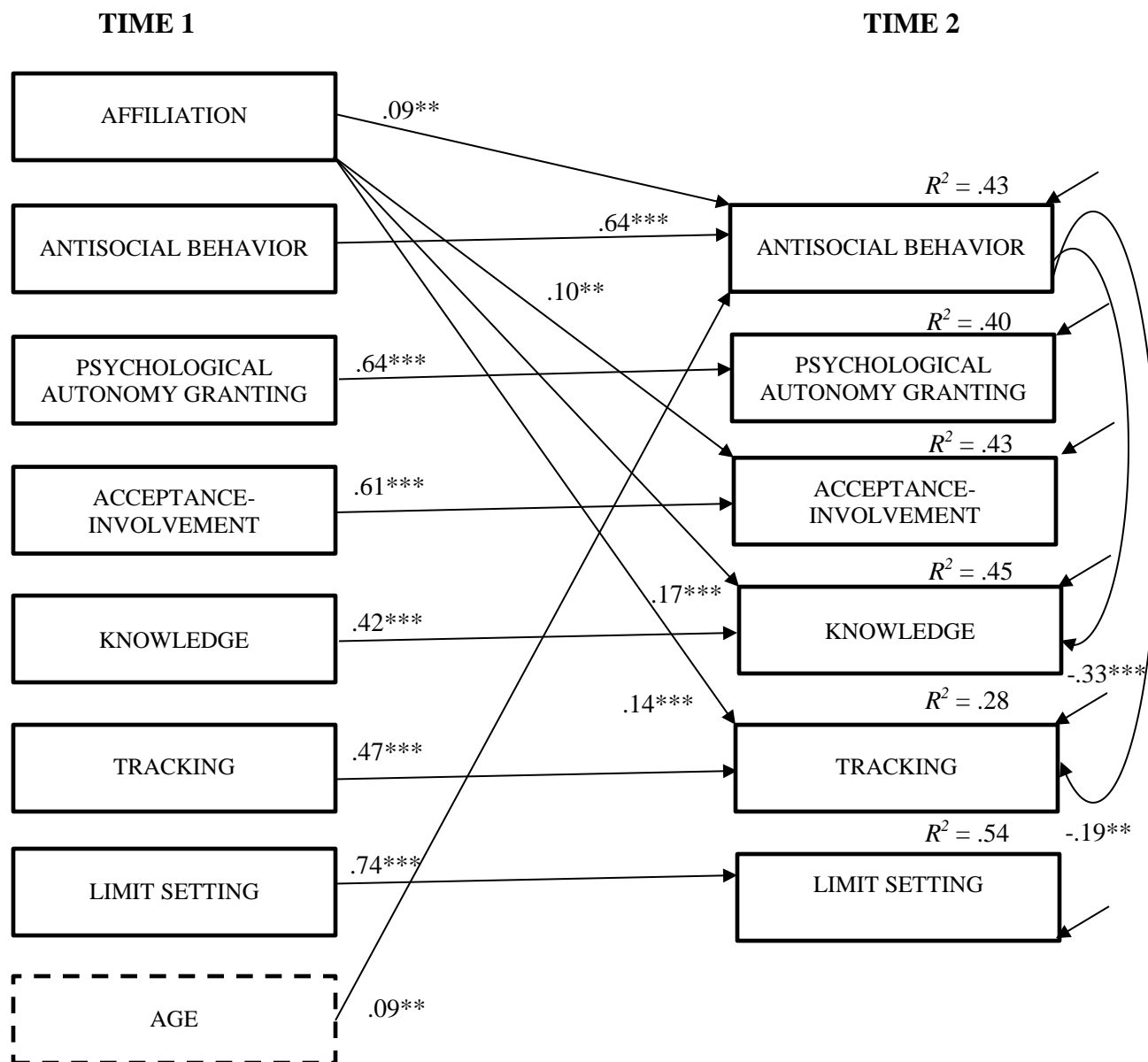
Contrary to hypotheses, affiliation at time 1 related to more antisocial behavior at time 2 ( $\beta = .090$ ,  $SE = .010$ ,  $p < .01$ ). Antisocial behavior at time 2 did not relate to psychological autonomy granting, acceptance-involvement, or limit setting at time 2.

Antisocial behavior was negatively related to parental knowledge ( $\beta = -.331$ ,  $SE = .166$ ,  $p < .001$ ) and tracking ( $\beta = -.186$ ,  $SE = .230$ ,  $p < .01$ ).

In terms of indirect effects, affiliation at time 1 was not related to psychological autonomy granting or limit setting at time 2 through antisocial behavior. However, affiliation was indirectly related to acceptance-involvement ( $\beta = -.007$ ,  $p < .05$ ), parental knowledge ( $\beta = -.030$ ,  $p < .05$ ), and tracking ( $\beta = -.017$ ,  $p < .01$ ). In other words, more affiliation at time 1 predicted more antisocial behavior at time 2 which related to less acceptance-involvement. Similarly, more affiliation at time 1 predicted more antisocial behavior at time 2 which related to less parental knowledge. Finally, more affiliation at time 1 predicted more antisocial behavior at time 2 which related to less tracking.

At time 1, the covariate age was negatively related to affiliation and negatively related to the parenting variables except for tracking with which it was positively related. It was also positively related to antisocial behavior at time 1 and predicted antisocial behavior over time.

**Gender as a moderator.** A non-significant chi square difference test suggested that constraining the paths to be equal between the two genders did not significantly improve or worsen model fit compared to the unconstrained model ( $\chi^2_{\text{diff}}(36) = 23.33$ ,  $p > .05$ ). Accordingly, it did not seem as though the pattern of results was moderated by adolescent gender.



**Figure 3.3.** Diagram of significant paths and squared correlations for alternate model based on adolescent-reported parenting

*Note.* Values indicate standardized beta weights. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . The covariate is indicated by a dashed rectangle, and was allowed to covary with the time 1 variables and time 2 error terms (double-headed arrows not pictured here). Error terms at time 2 were allowed to covary (double-headed arrow not pictured here).

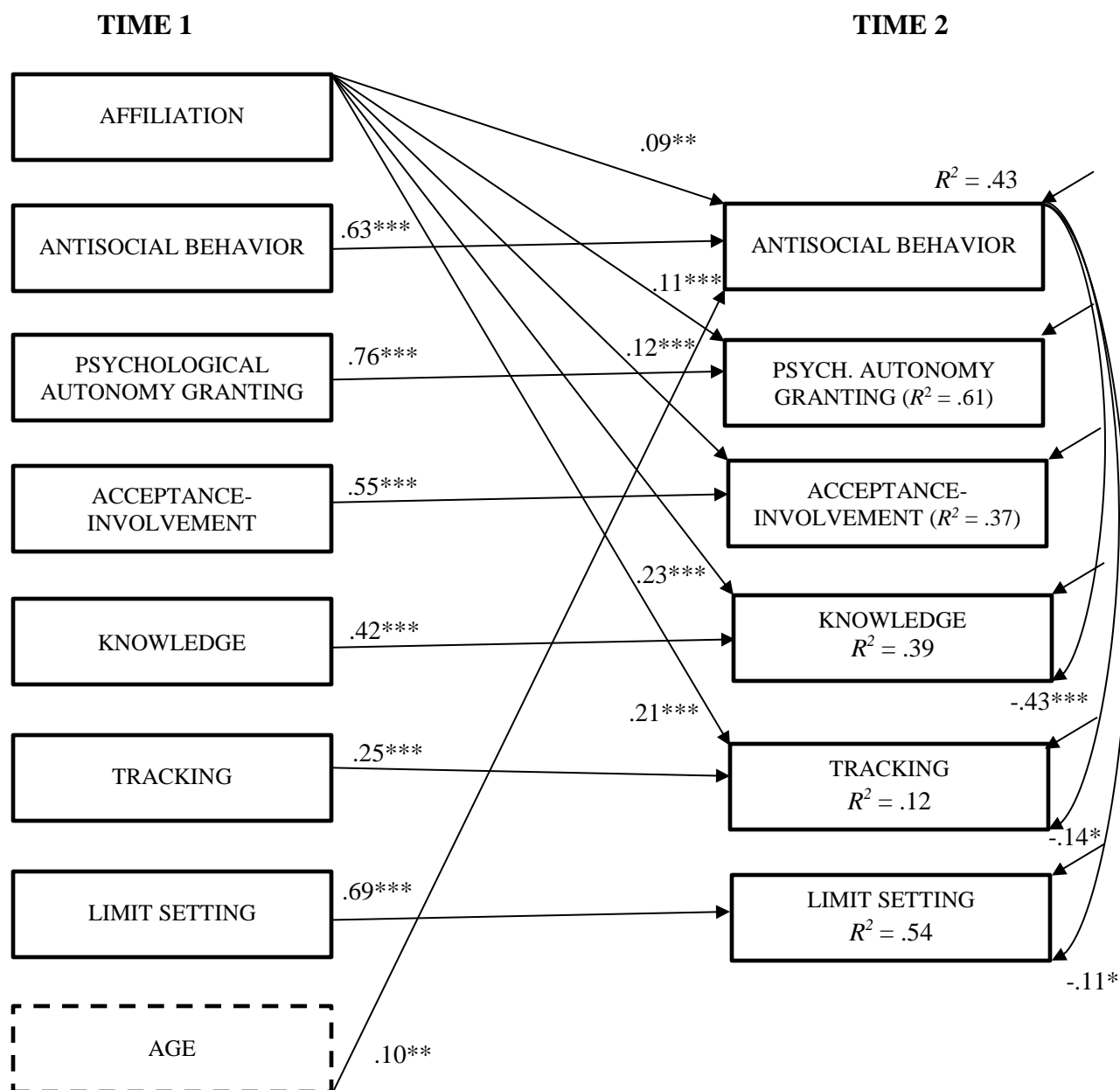
**Alternate model based on mother report.** The path diagram of this model is shown in Figure 3.4. The model fit indices for this model suggested the model fit the data moderately well ( $CFI = .934$ ,  $RMSEA = .071$ ,  $90\% CI = .065-.077$ ). All auto-regressive paths of parenting and antisocial behavior were significant and affiliation at time 1 positively predicted antisocial behavior at time 2 accounting for initial levels of antisocial behavior ( $\beta = .091$ ,  $p < .01$ ). The covariate, age at time 1, was positively related to antisocial behavior at time 2. Also, affiliation at time 1 positively predicted the following parenting variables at time 2: psychological autonomy granting, acceptance-involvement, parental knowledge, and tracking, but not limit setting.

Antisocial behavior at time 2 was negatively related to knowledge ( $\beta = -.427$ ,  $SE = .111$ ,  $p < .001$ ), tracking ( $\beta = -.135$ ,  $SE = .109$ ,  $p < .05$ ), and limit setting ( $\beta = -.108$ ,  $SE = .317$ ,  $p < .05$ ). Antisocial behavior at time 2 did not predict acceptance-involvement. Neither did it predict psychological autonomy granting at time 2, when accounting for initial levels of psychological autonomy granting, perhaps due to the high stability of this variable ( $\beta = .764$ ,  $p < .001$ ).

In terms of indirect effects between affiliation and parenting through antisocial behavior, because affiliation was related positively to antisocial behavior which was related negatively to parental knowledge, more affiliation at time 1 was indirectly related to less knowledge at time 2 ( $\beta = -.039$ ,  $p < .01$ ). In the same way, affiliation was indirectly negatively related to tracking ( $\beta = -.012$ ,  $p < .05$ ) and limit-setting ( $\beta = -.010$ ,  $p < .01$ ) through time 2 antisocial behavior. In other words, more affiliation at time 1 predicted greater involvement in antisocial behavior at time 2 which related to less tracking and less limit-setting. The indirect effects for affiliation on psychological

autonomy granting and acceptance-involvement through antisocial behavior were non-significant.

**Gender as a moderator.** There was a non-significant difference between the model fit of the unconstrained model and constrained model in which regression weights were constrained to be equal between genders ( $\chi^2_{\text{diff}}(36) = 25.07, p > .05$ ). This suggests that gender did not moderate the pattern of associations between affiliation, antisocial behavior, and authoritative parenting over time.



**Figure 3.4.** Diagram of significant paths and squared correlations for alternate model based on mother-reported parenting

*Note.* Values indicate standardized beta weights. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . The covariate is indicated by a dashed rectangle, and was allowed to covary with the time 1 variables and time 2 error terms (double-headed arrows not pictured here). Error terms at time 2 were allowed to covary (double-headed arrow not pictured here).

**Table 3.5**

*Summary table of standardized beta coefficients, standard errors, and probability levels of direct effects for alternate models based on mother and adolescent reports of parenting*

<b>Path</b>	<b>Mother</b>			<b>Adolescent</b>		
	<b><math>\beta</math></b>	<b><i>SE</i></b>	<b><i>p</i></b>	<b><math>\beta</math></b>	<b><i>SE</i></b>	<b><i>p</i></b>
PAG1→PAG2	.764	.022	<.001	.635	.027	<.001
AI1→AI2	.554	.026	<.001	.606	.025	<.001
Know1→Know2	.421	.027	<.001	.415	.029	<.001
Track1→Track2	.248	.021	<.001	.468	.023	<.001
LS1→LS2	.693	.028	<.001	.738	.028	<.001
AFF1→AB2	.091	.010	<.01	.090	.010	<.01
AB1→AB2	.629	.034	<.001	.635	.034	<.001
AB2→PAG2	.032	.086	.450	.031	.142	.557
AB2→AI2	-.070	.073	.197	-.083	.125	.109
AB2→Know2	-.427	.111	<.001	-.331	.166	<.001
AB2→Track2	-.135	.109	<.05	-.186	.230	<.01
AB2→LS2	-.108	.317	<.05	.032	.374	.503
AFF1→PAG2	.110	.017	<.001	.034	.028	.317
AFF1→AI2	.119	.015	<.001	.097	.025	<.01
AFF1→Know2	.233	.022	<.001	.174	.031	<.001
AFF1→Track2	.214	.022	<.001	.136	.047	<.001
AFF1→LS2	.043	.061	.152	.047	.072	.117

## **Discussion**

The primary aim of this study was to examine whether affiliation, an aspect of temperament that is defined as one's desire for relational closeness apart from shyness and extraversion (Putnam et al., 2001), is a mechanism through which authoritative parenting has an indirect effect on antisocial behavior in adolescence. The second aim of the study was to examine whether adolescent affiliation related indirectly to changes in parenting over time through antisocial behavior. Both models accounted for the stability of intervening and outcome variables (which was moderate to high), thereby attenuating some direct effects of the predictors, but meanwhile improving the methodological rigor of the study.

### **Indirect Effects of Parenting on Antisocial Behavior through Affiliation**

Given the dearth of research concerning temperament affiliation and its relation to authoritative parenting and antisocial behavior, research concerning empathy and agreeableness (constructs related to affiliation) and callous-unemotional traits (related to antisocial behavior), was used to form the hypotheses for the current study. Because of the relation between affiliation and empathy (Nigg, 2006), and the overlap between affiliativeness and the personality equivalent agreeableness (Evans & Rothbart, 2007), it was hypothesized that affiliation would be inversely related to antisocial behavior. Even though the zero-order correlation between time 1 affiliation and time 2 antisocial behavior was .00 and non-significant, and the correlation between time 2 affiliation and time 2 antisocial behavior was positive but non-significant, the zero-order correlation between time 1 affiliation and time 1 antisocial behavior showed the expected pattern, consistent with theory and research that affiliation would reduce antisocial behavior due



to greater caring about harm to others and social relationships. However, results from the longitudinal path analyses did not support this hypothesis.

While the current study did find indirect effects of parenting on antisocial behavior through affiliation for psychological autonomy granting, acceptance-involvement, knowledge, and limit setting, affiliation was unexpectedly positively related to antisocial behavior. The finding that affiliation was positively related to antisocial behavior over time is corroborated by one other study in which affiliation was found to be positively associated with antisocial behavior toward peers (Snyder et al., 2015), and potentially aligns with previous research that shows that some antisocial behavior, particularly for boys, is adaptive for strengthening social status among peers (e.g., Buss, 1988). In light of this, some affiliative adolescents may engage in certain antisocial behaviors as a means to improve social relations. Brechwald and Prinstein (2011) gave a hypothetical example of an adolescent who is motivated to drink alcohol and so conform to the antisocial behaviors of popular peers in an attempt to achieve a similar status of popularity. But in the current study, there were no gender differences for the effect of affiliation on antisocial behavior. It seems that for both boys and girls, adolescence is a developmental period in which success among peers is paramount because it serves as a source of identity (Brechwald & Prinstein, 2011), and possibly leads to affiliative adolescents being more prone to imitate antisocial behaviors of peers.

Relatedly, affiliation may increase one's likelihood to spend time with peers in unsupervised settings where antisocial behaviors are more likely to occur (e.g., Warr, 2002). Empirical testing of a process called deviancy training, by which adolescents are socialized to become more similar to their peers' antisocial attitudes and behaviors (e.g.,

Dishion, Spracklen, Andrews, & Patterson, 1996), has been borne out of prominent theories like social learning theory (Bandura, 1986). Moreover, adolescents tend to spend more time with friends who are similar to themselves, a phenomenon termed homophily. Poulin and Boivin (2000) observed a tendency in proactively aggressive children to affiliate with similar peers and form friendship networks. This suggests that adolescents are not only reinforced in their antisocial behaviors through socialization effects, but that they also select friends who share antisocial values and norms.

On the other hand, adolescents who are less affiliative (i.e., have a lower desire for emotional connectedness with others) may spend less time in social settings and thereby avoid peer pressure to engage in antisocial behavior or avoid social settings where antisocial behavior is more likely. This explanation would also help account for the negative association at time 1 between affiliation and antisocial behavior but the positive link longitudinally and at time 2 in the path models. At time 1, both mothers and adolescents reported stricter limit setting (earlier curfew) which would curtail the amount of unsupervised time spent with peers. At time 2, however, adolescents were on average granted later curfews which would allow more affiliative adolescents the opportunity to spend more unsupervised time with peers and thus an increased opportunity to engage in antisocial behaviors. Indeed, the current study found that limit setting predicted less affiliation over time, and Mercer, Keijsers, Crocetti, Branje, and Meeus (2016) found that time spent with peers was associated with a greater likelihood of being an experimenter than an abstainer of delinquency in a sample of 13- to 18-year-old adolescents. Thus, the current finding suggests that the effects of affiliation, the desire for close, warm relationships, may depend on the characteristics of the friends.

It was hypothesized that parental warmth and responsiveness would be the parenting dimension that was most strongly linked with adolescent affiliation.

Acceptance-involvement is the degree to which adolescents perceive their parents to be supportive and involved in their lives, and in the context of authoritative parenting, it tends to foster secure attachment in the child (Morris, Silk, Steinberg, Myers, & Robinson, 2007). Attachment theory suggests that early experiences with parents and caregivers form the basis of one's view of self in relation to others, and shapes how he or she values close, intimate relationships in the future (Bowlby, 1982). Thus, acceptance-involvement was expected to relate to greater adolescent affiliation over time. Support was found for this hypothesis when analyzing the data using mother-reported parenting, in that mothers who perceived themselves to be more accepting and involved in their children's lives tended to have adolescent children who were more affiliative. In fact, of the parenting variables for which there were significant indirect effects, mother-rated acceptance-involvement was the only parenting variable that predicted more affiliation over time. In the sense that affiliation indicates one's affinity for spending time with friends, the current finding relates to evidence that maternal support has a positive significant relation with time spent with peers in adolescence (Mercer et al., 2016).

In contrast, mother-rated psychological autonomy granting, knowledge, and limit setting according to both mother and adolescent reports, predicted less affiliation over time. Even though the current measure of affiliation reflected a desire for warmth and closeness with others and not affiliation with deviant peers, together, these findings seem consistent with previous research indicating that aspects of authoritative parenting reduce association with antisocial peers. Specifically, the finding regarding psychological

autonomy granting seems concordant with research on self-determination theory, in which autonomy-supportive parenting is negatively indirectly related to affiliation with deviant peers through greater internalization of parental rules (Soenens, Vansteenkiste, & Sierens, 2009). The findings regarding knowledge and limit setting are consistent with previous research showing that family management degradation (i.e., premature autonomy, removal of parental involvement and guidance because of adolescents' previous involvement in antisocial behavior) interacts with deviant peer involvement to predict later adolescent antisocial behavior (Dishion, Nelson, & Bullock, 2004). In the current study, adolescents who had earlier curfews at time 1 tended to be less affiliative at time 2, and adolescents who had later curfews tended to be more affiliative over time. Because affiliation related to more antisocial behavior, this finding suggests that giving adolescents age-appropriate limits may help lessen the likelihood of involvement in antisocial behavior.

The idea should be expanded here, however, that the effect of affiliation on antisocial behavior may depend upon the characteristics of the individual. For example, adolescents who are higher in antisocial behavior may affiliate more with other adolescents who are high in antisocial behavior (according to homophily effects), and consequently may end up higher in antisocial behavior themselves over time (through deviancy training). Conversely, adolescents who are lower in antisocial behavior may affiliate more with other adolescents who are low in antisocial behavior, and therefore may have limited exposure to deviancy training. In other words, the desire to affiliate with others may not in itself lead to increases in antisocial behavior, but it may do so depending on the nature of the friends with whom individuals prefer relational closeness.

Finally, from this perspective, adolescents who are high in antisocial behavior but low in affiliation may be protected from further increases in antisocial behavior, by having fewer opportunities to be exposed to antisocial friends and the process of deviancy training.

### **Indirect Effects of Affiliation on Parenting through Antisocial Behavior**

There was also evidence for reciprocal relations in that adolescent affiliation was directly and indirectly linked to authoritative parenting through adolescent antisocial behavior. Significant indirect effects were found for affiliation on knowledge, tracking, adolescent-rated acceptance-involvement, and mother-rated limit setting. Again, affiliation was unexpectedly positively associated with antisocial behavior, so that the indirect effects of affiliation on parenting through antisocial behavior were negative. In this model, affiliation at time 1 was positively related to antisocial behavior at time 2 (a longitudinal effect), whereas in the first model, the relation was concurrent at time 2. Paths from antisocial behavior to authoritative parenting were negative, as hypothesized, and these findings are consistent with research showing that negative child traits can evoke negative forms of parenting or less authoritative parenting (e.g., Larsson, Viding, Rijdsdijk, & Plomin, 2008). There were direct positive effects between affiliation and acceptance-involvement, knowledge, and tracking, and mother-reported psychological autonomy granting, holding initial levels of parenting constant. High affiliation may promote higher quality parent-child relationships (i.e., acceptance-involvement). Because parental knowledge is predicated largely on adolescent self-disclosure (Stattin & Kerr, 2000), adolescents who are more affiliative and have a greater desire for warm, close relationships, may be more likely to disclose information to their parents thus increasing

their knowledge over time. Parents may also feel more inclined to ask questions of adolescent children who are more affiliative. The positive, direct effect of affiliation on psychological autonomy granting is interesting, however, in light of the finding that affiliation is positively associated with antisocial behavior. Giving a highly affiliative adolescent more autonomy may be problematic if they are using that freedom to engage in antisocial behavior (possibly with high antisocial behavior peers). In general, though, it seemed that the direct, positive effects of adolescent affiliation on several aspects of authoritative parenting are consistent with theory and research on evocative person-environment correlations (e.g., Rutter, 2006; Lengua & Kovacs, 2005) suggesting that positive child traits evoke more positive aspects of parenting. These findings relate to many similar findings in a review by Kiff, Lengua, and Zalewski (2011) who reported that positive temperament traits (e.g., self-regulation or effortful control) tended to evoke more positive parenting, but it extends their work by providing support for the hypothesis that another aspect of temperament, adolescent affiliation, influences parenting as parenting influences adolescent affiliation.

As mentioned, there were significant indirect effects between affiliation at time 1 which related to more antisocial behavior at time 2 which related to lower levels of parental knowledge and tracking according to both informants. These findings align with previous research which shows that parents of antisocial adolescents are less knowledgeable about their children's activities contemporaneously (Fite, Colder, Lochman, & Wells, 2006) and over time (Moilanen, Shaw, Criss, & Dishion, 2009; Willoughby & Hamza, 2011). This is possibly because antisocial adolescents are less likely to self-disclose information to parents (Stoolmiller, 1994; Kerr, Stattin, & Burk,

2010; Keijsers et al., 2010), but also because parents could respond to antisocial behavior by inadvertently or intentionally distancing themselves to avoid conflict, an interpretation in line with work by Dishion et al. (2004). In other words, parents may become less knowledgeable because they are tracking less (e.g., asking fewer questions), thereby giving the adolescent the perception of having more behavioral “space” and freedom to engage in more antisocial behaviors. Also, mothers reported giving later curfews to adolescents who engaged in more antisocial behavior as was seen in the finding that antisocial behavior at time 2 was negatively related to limit setting according to mother report. In summary, these findings coalesce with other bidirectional studies of parenting and adolescent temperament and behavior (e.g., Lengua & Kovacs, 2005) and underscore the importance of accounting for bidirectional effects in future models of parenting, affiliation, and antisocial behavior.

They also, however, once again underscore the importance of considering the possibility that the effect of affiliation may depend on the characteristics of the individual. The results seem somewhat contradictory, that affiliation is positively associated with authoritative parenting, but also indirectly associated with decreases in authoritative parenting through its positive, direct relation with antisocial behavior. It may be that for individuals who are low in antisocial behavior, affiliation influences development positively, for example, by increasing the likelihood of authoritative parenting. In youth who are high in antisocial behavior, though, affiliation may have the potential to have adverse effects on development, by increasing the likelihood of antisocial behavior through association with antisocial friends and the process of deviancy training. Thus, the characteristics of the people with whom adolescents desire to

have a relationship, and the quality of those relationships, may be critical factors in how affiliation affects development. Future research should examine this more closely.

### **Implications for Parents**

The current study has important implications for parents and care providers of adolescents. Some aspects of authoritative parenting (acceptance-involvement) promote higher affiliation, which in general is associated with lower antisocial behavior (zero-order correlations), but which may also increase risk of antisocial behavior over time during adolescence. Conversely, some aspects of authoritative parenting (psychological autonomy granting, knowledge, and limit setting) reduce affiliation, and thereby indirectly lower the risk of antisocial behavior. Therefore, gaining knowledge of adolescent friendships, activities, and whereabouts, placing reasonable and appropriate limits on adolescent activities, and granting developmentally appropriate autonomy, in combination with having a relationship characterized by acceptance and involvement, may yield the best outcomes with respect to adolescent affiliation and subsequent involvement in antisocial behavior.

In other words, acceptance-involvement may help to promote affiliation, which has certain benefits regarding antisocial behavior, but also has the general benefit of being open to close relationships. The ability for individuals to have close relationships is key to good psychological adjustment, such as reducing the risk of depression, and post-traumatic stress disorder, through social support (e.g., Wilcox, 1981). High levels of parental knowledge and limit setting, however, may help to reduce the risk of a tendency toward affiliation leading to affiliation with deviant peers and deviancy training. As well, research on self-determination theory (e.g., Ryan & Deci, 2000) suggests that high levels



of psychological autonomy granting may help to reduce the risk of affiliation with deviant peers by increasing the likelihood of adolescents internalizing and integrating parental values prohibiting antisocial behavior. Although, the social relationships of someone who is high in affiliation may depend on their characteristics, such as whether they are involved in antisocial behavior themselves or not. If they are, they may be more likely to pursue friendships with similarly antisocial peers, but if they are not, affiliation may lead to lower levels of antisocial behavior through caring for others and considering the social costs of antisocial behavior.

### **Strengths and Limitations**

One limitation of the current study is that the antisocial behavior measure was only based on adolescent self-report. Even though this method has been shown to have good reliability, it would have been helpful to have mothers rate their children's antisocial behavior especially in testing the alternate model in which adolescent temperament and antisocial behavior predicted maternal parenting. Likely, a mother's perception of her child's antisocial behavior would be more influential in shaping her parenting such as limit-setting, acceptance-involvement, and psychological autonomy granting. However, mother reports of antisocial behavior are also likely to be confounded by the degree to which mothers are knowledgeable about their child's activities, friendships, and whereabouts. As mentioned, adolescents who engage in more antisocial behavior are less likely to disclose information to their parents and may be more secretive about their behavior, thus attenuating mother reports of adolescent antisocial behavior.

Second, even though this study involved affiliation as an aspect of temperament, specific instances of adolescent affiliation with a peer group were not taken into account.

For instance, to what extent does authoritative parenting relate to less antisocial behavior over time through positive peer relations? Along these lines, even though the parent-child relationship is important in the development of affiliation in adolescence, so too is the nature of the relationships the child has with his or her peers. In other words, do peers influence the development of adolescent affiliation and subsequent involvement in antisocial behavior? And along these lines, adolescents spend a significant amount of extracurricular time in unsupervised settings with their peers (McCuaig-Edge & Craig, 2012), aggressive children are more likely to befriend other aggressive children (Poulin & Boivin, 2000), and in a process called deviancy training, antisocial and aggressive behaviors are modeled and reinforced by antisocial peers (Dishion et al., 1996). In other words, the somewhat contradictory effects of the current study may suggest that the effect of affiliation depends on the characteristics of the friends with whom the adolescent wants to have a warm and close relationship. But it was beyond the scope of the current study to explore the effects of friends' antisocial behavior on the longitudinal relations between parenting, affiliation, and antisocial behavior.

Third, there was a large proportion of missing data in this study which poses a methodological limitation. Several options for handling missing data were considered, but the expectation-maximization option available in SPSS was most suitable. Even though missing values analysis suggested that data were missing at random (i.e., there were not systematic differences between the participants who completed questionnaires at both waves and those who discontinued in the study), it is possible that estimates and results were slightly biased. However, to examine the extent to which this may have been an issue, the same analyses were conducted using the data of those participants who

completed questionnaires at both waves. The nature of relations between the variables and the effects of the path analyses were the same as those found for the whole sample ( $n = 521$ ), but some of the effects failed to reach significance. Because the sample size was smaller for those who participated at both waves ( $n = 254$ ), it is possible that lower statistical power to find significant effects contributed to the fewer significant findings.

Despite inherent limitations, the greatest strength of the current study is the major contribution it makes to the literature concerning temperament, which is presently lacking with respect to empirical studies of affiliation. The current study shows that temperamental affiliation may be changed by parental limit setting, that affiliation may have positive effects on several dimensions of authoritative parenting, and that affiliation may relate to increases in antisocial behavior dependent upon characteristics of the individual, and whether or not the individuals whom he or she affiliates with engage in antisocial behaviors themselves.

### **Suggestions for Future Research**

Much of the research concerning the relation between affiliation and antisocial behavior has been in regard to affiliation with deviant peers (i.e., friends' antisocial behavior) as opposed to temperamental affiliation. It is true that adolescence is a time when individuals become increasingly more interested in spending time with their peers than with their parents and that this affiliation can be a risk if the friends are antisocial themselves (Dishion et al., 1996), however, affiliation is not necessarily risky in itself. Future research could explore how affiliation as a temperament trait may differentially relate to antisocial behavior as a function of friends' antisocial behaviors. For example, affiliation may serve as a protective factor if the adolescent desires relational closeness

with well-behaving peers, but conversely may serve as a risk factor if the adolescent desires relational closeness with antisocial peers, especially during adolescence when susceptibility to peer influence is at its peak (Monahan, Steinberg, & Cauffman, 2009).

In addition, future research should continue to explore the ways in which parenting and affiliation are related to each other, and how affiliation and antisocial behavior are related to each other as this is still a vastly open area of temperament to explore. For example, to the extent that affiliation and empathy are similar, authoritative parenting may buffer the effects of low affiliation in relation to antisocial behavior, and in a similar way, high affiliation may buffer the effects of parenting that is less authoritative in relation to antisocial behavior. Rothbart (2011) stated that low affiliativeness can protect against development of problems when parenting is poor. But a study by Prinzie et al. (2004) found that parents' angry discipline was more strongly related to behavior problems when children were low in agreeableness than when children were highly agreeable. Therefore, moderation analyses including parenting, temperamental affiliation, and antisocial behavior would be helpful in further exploring the nature of the relations between these variables.

### **Conclusions**

Despite the theoretical relevance of adolescent affiliation to adolescent antisocial behavior, there is currently very little research concerning the relation between affiliation as an aspect of temperament and antisocial behavior in this age group. To help fill this gap in the literature, the current study used a half-longitudinal design to explore the direct and indirect relations between authoritative parenting, affiliation, and antisocial behavior in a community sample of male and female adolescents. Authoritative parenting was

expected to relate positively to affiliation, and affiliation was expected to relate negatively to antisocial behavior, but findings suggested that affiliation did not function in the anticipated way.

Affiliation may be a double-edged sword in relation to adolescent antisocial behavior. On the one hand, there was a small negative zero-order correlation between time 1 affiliation and time 1 antisocial behavior, consistent with theory and research that it would reduce antisocial behavior due to greater caring about harm to others and social relationships. Also, it seems to evoke authoritative parenting, which has been shown in previous research to predict less antisocial behavior. However, affiliation is also associated with more antisocial behavior over time in this adolescent sample.

Consequently, some aspects of authoritative parenting that previous theory and research have shown to reduce the likelihood of antisocial behavior (e.g., acceptance-involvement), were indirectly positively related to antisocial behavior through increases in affiliation. Other aspects of authoritative parenting (e.g., psychological autonomy granting, knowledge, limit setting) reduce affiliation over time, and therefore indirectly reduce antisocial behavior over time. The two aspects of affiliation may reflect the temperamental concept pertaining to the desire for close relationships, but also, at least in the adolescent context, the likelihood of unsupervised peer involvement. For some adolescents, this may involve more unsupervised affiliation with antisocial peers, which in turn can provide a context for deviancy training.

In all, the current study provides additional support for a temperament-based theory of antisocial behavior (DeLisi & Vaughn, 2014), and for bidirectional examination

of effects between parents and adolescents, but extends previous research by examining the diverse role of adolescent affiliation with respect to parenting and antisocial behavior.

## References

- Allen, J.P., Moore, C., Kuperminc, G., & Bell, K. (1998). Attachment and adolescent psychosocial functioning. *Child Development*, 69(5), 1406-1419.
- Ashton, M., & Lee, K. (2001). A theoretical basis for the dimensions of personality. *European Journal of Personality*, 15, 327-353.
- Bandura, A (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Belsky, J., Fish, M., & Isabella, R. (1991). Continuity and discontinuity in infant negative and positive emotionality: Family antecedent and attachment consequences. *Developmental Psychology*, 27, 421-431.
- Blair, R.J.J. (2013). The neurobiology of psychopathic traits in youths. *Nature Reviews. Neuroscience*, 14(11), 786-799. <http://doi.org/10.1038/nrn3577>
- Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation modeling perspective*. Hoboken, NJ: Wiley.
- Book, A.S., Volk, A.A., & Hosker, A. (2012). Adolescent bullying and personality: An adaptive approach. *Personality and Individual Differences*, 52, 218-223.
- Bowlby, J. (1982). Attachment and loss: Retrospect and prospect. *American Journal of Orthopsychiatry*, 52(4), 664-678. <http://dx.doi.org/10.1111/j.1939-0025.1982.tb01456.x>
- Braungart-Rieker, J.M., Hill-Soderlund, A.L., & Karrass, J. (2010). Fear and anger reactivity trajectories from 4 to 16 months: The roles of temperament, regulation, and maternal sensitivity. *Developmental Psychology*, 46(4), 791-804.
- Brechwald, W.A. & Prinstein, M.J. (2011). Beyond homophily: A decade of advances in understanding peer influence processes. *Journal of Research on Adolescence: The Official Journal of the Society for Research on Adolescence*, 21(1), 166-179.
- Buss, D.M. (1988). The evolution of human intrasexual competition: Tactics of mate attraction. *Journal of Personality and Social Psychology*, 54(4), 616-628.
- Buss, D.M. (2009). How can evolutionary psychology successfully explain personality and individual differences? *Perspectives on Psychological Science*, 4, 359-366.
- Buss, A.H., & Plomin, R. (1975). *A temperament theory of personality development*. New York: Wiley.

- Buss, A.H., & Plomin, R. (1984). *Temperament: Early developing personality traits*. Hillsdale, NJ: Erlbaum.
- Chakrabarti, B., & Baron-Cohen, S. (2006). Empathizing: neurocognitive developmental mechanisms and individual differences. *Progress in Brain Research*, 156, 403–417.
- Chung, H.L. & Steinberg, L. (2006). Relations between neighborhood factors, parenting behaviors, peer deviance, and delinquency among serious juvenile offenders. *Developmental Psychology*, 42(2), 319-331.
- Costa, P.T.Jr., & McRae, R.R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) professional manual*. Odessa, Florida: Psychological Assessment Resources, Inc.
- Crouter, A.C., Bumpus, M.F., Davis, K.D., & McHale, S.M. (2005). How do parents learn about adolescents' experiences? Implications for parental knowledge and adolescent risky behavior. *Child Development*, 76(4), 869-882.
- Dane, A., McPhee, J., Root, L. & Derevensky, J. (2004). *Parental socialization of youth gambling*. Report to the Ontario Problem Gambling Research Centre, Guelph, Ontario.
- Del Giudice, M. (2009). Sex, attachment, and the development of reproductive strategies. *Behavioral and Brain Sciences*, 32, 1-67.
- Del Giudice, M., & Belsky, J. (2010). Sex differences in attachment emerge in middle childhood: An evolutionary hypothesis. *Child Development Perspectives*, 4(2), 97-105.
- Dishion, T.J., Nelson, S.E., & Bullock, B.M. (2004). Premature adolescent autonomy: Parent disengagement and deviant peer process in the amplification of problem behavior. *Journal of Adolescence*, 27, 515-530.
- Dishion, T.J., Spracklen, K.M., Andrews, D.W., & Patterson, G.R. (1996). Deviancy training in male adolescent friendships. *Behavior Therapy*, 27, 373-390.
- Ellis, L. K., & Rothbart, M. K. (2001, April). *Revision of the Early Adolescent Temperament Questionnaire*. Poster presented at the biennial meeting of the Society for Research in Child Development, Minneapolis, MN.
- Evans, D.E., & Rothbart, M.K. (2007). Developing a model for adult temperament. *Journal of Research in Personality*, 41, 868-888.



- Evans, D.E., & Rothbart, M.K. (2009). A two-factor model of temperament. *Personality and Individual Differences*, 47(6), 565-570.  
<http://doi.org/10.1016/j.paid.2009.05.010>
- Farrell, A.H., Brook, C., Dane, A.V., Marini, Z.A., & Volk, A.A. (2015). Relations between adolescent ratings of Rothbart's temperament questionnaire and the HEXACO personality inventory. *Journal of Personality Assessment*, 97, 163-171.
- Fite, P.J., Colder, C.R., Lochman, J.E., & Wells, K.C. (2006). The mutual influence of parenting and boys' externalizing behavior problems. *Journal of Applied Developmental Psychology*, 27, 151-164.
- Gilbert, P. (2015). Affiliative and prosocial motives and emotions in mental health. *Dialogues in Clinical Neuroscience*, 17(4), 381-389.
- Gini, G., Pozzoli, T., & Bussey, K. (2015). Moral disengagement moderates the link between psychopathic traits and aggressive behavior among early adolescents. *Merrill-Palmer Quarterly*, 61(1).
- Goldberg, L.R. (1990). An alternative "Description of personality": The Big-Five factor structure. *Journal of Personality and Social Psychology*, 59, 1216-1229.
- Gray, M.R., & Steinberg, L. (1999). Unpacking authoritative parenting: Reassessing a multidimensional construct. *Journal of Marriage and Family*, 61(3), 574-587.
- Hawley, P.H. (2011). The role of competition and cooperation in shaping personality: An evolutionary perspective on social dominance, Machiavellianism, and children's social development. In D. M. Buss & P. H. Hawley (Eds.), *The evolution of personality and individual differences* (pp. 76-110). New York, NY: Oxford University Press.
- Henry, D.B., Tolan, P.H., & Gorman-Smith, D. (2001). Longitudinal family and peer group effects on violence and nonviolent delinquency. *Journal of Clinical Child Psychology*, 30, 172-186.
- Hu, L., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55.
- Karavasilis, L., Doyle, A.B., & Markiewicz, D. (2003). Association between parenting style and attachment to mother in middle childhood and adolescents. *International Journal of Behavioral Development*, 27(2), 153-164.
- Keijsers, L., Branje, S.J., VanderValk, I.E., & Meeus, W. (2010). Reciprocal effects between parental solicitation, parental control, adolescent disclosure, and adolescent delinquency. *Journal of Research on Adolescence*, 20(1), 88-113.

- Kerr, M., Stattin, H., & Burk, W.J. (2010). A reinterpretation of parental monitoring in longitudinal perspective. *Journal of Research on Adolescence*, 20(1), 39-64.
- Kiff, C.J., Lengua, L.J., & Zalewski, M. (2011). Nature and nurturing: Parenting in the context of child temperament. *Clinical Child and Family Psychology Review*, 14(3), 251-301.
- Klahr, A.M., Rueter, M.A., McGue, M., Iacono, W.G., & Burt, S.A. (2011). The relationship between parent-child conflict and adolescent antisocial behavior: Confirming shared environmental mediation. *Journal of Abnormal Child Psychology*, 39(5), 683-694.
- Kokkinos, C.M., Karagianni, K., & Voulgaridou, I. (2017). Relational aggression, big five and hostile attribution bias in adolescents. *Journal of Applied Developmental Psychology*, 52, 101-113.
- Larsson, H., Viding, E., Rijdsdijk, F.V., & Plomin, R. (2008). Relationships between parental negativity and childhood antisocial behavior over time: A bidirectional effects model in a longitudinal genetically informative design. *Journal of Abnormal Child Psychology*, 36(5), 633-645.
- Le Blanc, M., & Fréchette, M. (1989). *Male criminal activity from childhood through youth: Multilevel and developmental perspectives*. New York, NY: Springer-Verlag Publishing.
- Lee, K., & Ashton, M.C. (2012). *The H factor of personality: Why some people are manipulative, self-entitled, materialistic, and exploitive—And why it matters for everyone*. Waterloo, ON, Canada: Wilfrid Laurier University Press.
- Lengua, L.J. & Kovacs, E.A. (2005). Bidirectional associations between temperament and parenting and the prediction of adjustment problems in middle childhood. *Applied Developmental Psychology*, 26, 21-38.
- McCuaig-Edge, H., & Craig, W. (2012). Peers. In *The health of Canada's young people: A mental health focus*. Retrieved from <http://www.phac-aspc.gc.ca/hp-ps/dca-dea/publications/hbsc-mental-mentale/peers-camarades-eng.php>.
- Mercer, Keijsers, Crocetti, Branje, & Meeus (2016). Adolescent abstention from delinquency: Examining the mediating role of time spent with (delinquent) peers. *Journal of Research on Adolescence*, 1-16.
- Miller, J.D., & Lynam, D. (2001). Structural models of personality and their relation to antisocial behavior: A meta-analytic review. *Criminology*, 39, 765-798. doi:10.1111/j.1745-9125.2001.tb00940.x

- Miller, J.D., Lynam, D., & Leukefeld, C. (2003). Examining antisocial behavior through the lens of the five factor model of personality. *Aggressive Behavior*, 29(6), 497-514.
- Moffitt, T.E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, 100, 674-701.
- Moilanen, K.L., Shaw, D.S., Criss, M.M., & Dishion, T.J. (2009). Growth and predictors of parental knowledge of youth behavior during early adolescence. *Journal of Early Adolescence*, 29(6), 800-825.
- Monahan, K.C., Steinberg, L., & Cauffman, E. (2009). Affiliation with antisocial peers, susceptibility to peer influence, and antisocial behavior during the transition to adulthood. *Developmental Psychology*, 45(6), 1520-1530.
- Moretti, M.M., & Peled, M. (2004). Adolescent-parent attachment: Bonds that support healthy development. *Paediatrics & Child Health*, 9(8), 551-555.
- Morris, A.S., Silk, J.S., Steinberg, L., Myers, S.S., & Robinson, L.R. (2007). The role of the family context in the development of emotion regulation. *Social Development (Oxford, England)*, 16(2), 361-388. <http://doi.org/10.1111/j.1467-9507.2007.00389.x>
- Nigg, J.T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 47(3/4), 395-422.
- Ormel, J., Oldehinkel, A.J., Ferdinand, R.F., Hartman, C.A., Winter, A.F.D., Veenstra, R., Vollebergh, W., Minderaa, R.B., Buitelaar, J.K., & Verhulst, F.C. (2005). Internalizing and externalizing problems in adolescence: General and dimensions-specific effects of familial loadings and preadolescent temperament traits. *Psychological Medicine*, 35, 1825-1835.
- Poulin, F. & Boivin, M. (2000). The role of proactive and reactive aggression in the formation and development of boys' friendships. *Developmental Psychology*, 36(2), 233-240.
- Prinz, P., Onghena, P., Hellinckx, W., Grietens, H., Ghesquiere, P., & Colpin, H. (2004). Parent and child personality characteristics as predictors of negative discipline and externalizing problem behavior in children. *European Journal of Personality*, 18, 73-102.
- Putnam, P., Ellis, L.K., & Rothbart, M.K. (2001). The structure of temperament from infancy through adolescence. In A. Elias & A. Angleitner (Eds.), *Advances in research on temperament* (pp.65-182). Germany: Pabst Science.

- Rizzolatti, G., & Craighero, L. (2004). The mirror-neuron system. *Annual Review of Neuroscience*, 27, 169-192.
- Rothbart, M.K. (2007). Temperament, development, and personality. *Current Directions in Psychological Science*, 16(4), 207-212. doi: 10.1111/j.1467-8721.2007.00505.x
- Rothbart, M.K. (2011). *Becoming who we are: Temperament, personality and development*. New York: Guilford Press.
- Rothbart, M.K., & Derryberry, D. (1981). Development of individual differences in temperament. In: M.E. Lamb & A.L Brown (Eds.) *Advances in developmental psychology, Vol. 1* (pp. 37-86). Hillsdale, NJ: Erlbaum.
- Rothbart, M. K., & Rueda, M. R. (2005). The development of effortful control. In U. Mayr, E. Awh, & S. Keele (Eds.), *Developing individuality in the human brain: A tribute to Michael I. Posner* (167-188). Washington, DC: American Psychological Association.
- Rutter, M. (2006). *Genes and behavior: Nature–nurture interplay explained*. Oxford, UK: Blackwell Scientific.
- Ryan, R.M., & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78.
- Simonds J., & Rothbart M.K. (2004, October). The Temperament in Middle Childhood Questionnaire (TMCQ): A computerized self-report measure of temperament for ages 7-10. Poster session presented at the Occasional Temperament Conference, Athens, GA.
- Snyder, H.R., Gulley, L.D., Bijttebier, P., Hartman, C.A., Oldehinkel, A.J., Mezulis, A., Young, J.F., & Hankin, B.L. (2015). Adolescent emotionality and effortful control: Core latent constructs and links to psychopathology and functioning. *Journal of Personality and Social Psychology*, 109(6), 1132-1149.
- Soenens, B, Vansteenkiste, M., & Sierens, E. (2009). How are parental psychological control and autonomy-support related? A cluster-analytic approach. *Journal of Marriage and Family*, 71, 187-202.
- Stattin, H. & Kerr, M. (2000). Parental monitoring: a reinterpretation. *Child Development*, 71(4), 1072-1085.
- Stoolmiller, M. (1994). Antisocial behavior, delinquent peer association and unsupervised wandering for boys: Growth and change from childhood to early adolescence. *Multivariate Behavioral Research*, 29, 263-288.

- Veenstra, R., Lindenburg, S., Oldehinkel, A.J., De Winter, A.F., & Ormel, J. (2006). Temperament, environment, and antisocial behavior in a population sample of preadolescent boys and girls. *International Journal of Behavioral Development*, 30, 422-432.
- Veenstra, R., Lindenburg, S., Oldehinkel, A.J., De Winter, A.F., Verhulst, F.C., & Ormel, J. (2008). Prosocial and antisocial behavior in preadolescence: Teachers' and parents' perceptions of the behavior of girls and boys. *International Journal of Behavioral Development*, 32(3), 243-251.
- Waller, R., Trentacosta, C.J., Shaw, D.S., Neiderhiser, J.M., Ganiban, J.M., Reiss, D., Leve, L.D., & Hyde, L.W. (2016). Heritable temperament pathways to early callous-unemotional behavior. *The British Journal of Psychiatry*, 209(6), 475-482.
- Warr, M. (2002). *Companions in crime: The social aspects of criminal conduct*. New York: Cambridge University Press.
- Wilcox, B.L. (1981). Social support, life stress, and psychological adjustment: A test of the buffering hypothesis. *American Journal of Community Psychology*, 9(4), 371-386.
- Willoughby, T., & Hamza, C.A. (2011). A longitudinal examination of the bidirectional associations among perceived parenting behaviors, adolescent disclosure and problem behavior across the high school years. *Journal of Youth and Adolescence*, 40(4), 463-478.
- Zhang, W., & Wang, D. (2012). Affiliative temperament: Concept, neurobiology, and implications for antisocial behaviors. *Hormones and Signaling*, 47, 8986-8995.

## CHAPTER 4

### **Study 3: Indirect Effects involving Parenting, Frustration, and Antisocial Behavior**

Antisocial behavior is commonly defined as behaviors that violate the rights of others and deviate from societal norms (VandenBos & APA, 2006), and it may include overt acts such as violence, as well as covert ones such as vandalism and theft. There are documented mental and physical health problems which are associated with antisocial behavior for both the perpetrator (e.g., Odgers et al., 2008) and the victim (e.g., Ford, Elhai, Connor, & Frueh, 2010). When considering the common correlates of adolescent antisocial behavior, there is a large body of empirical research which supports the direct effects of authoritative parenting (Hoeve et al., 2009; Pinquart, 2017), and certain aspects of temperament (DeLisi & Vaughn, 2014), on antisocial behavior.

Temperament is defined as constitutionally-based individual differences in emotional reactivity and self-regulation (Rothbart & Derryberry, 1981). Factor analyses have shown that sadness, fearfulness, and anger/frustration are the temperament traits generally subsumed within the negative emotionality factor of temperament (Capaldi & Rothbart, 1992; Rothbart & Rueda, 2005). Frustration, which is the temperament variable that will be specifically examined in the current study, has been well-defined as “negative affect related to goal blocking or an interruption of ongoing tasks” (Veenstra et al., 2006). It is often studied within its broader dimension of negative emotionality, and it is also usually found to be related to emotional or reactive forms of antisocial behavior, such as reactive aggression (Blair, 2004; 2010). However, the direct effect of frustration on overt and covert antisocial behavior in adolescence has been minimally studied, and there is a dearth of research examining the longitudinal, indirect effects involving frustration,

parenting, and antisocial behavior. Thus, these gaps in the literature were addressed by the current study.

### **Frustration and Antisocial Behavior**

There are several theoretical and empirical reasons to undertake the current study. First, in his review of temperament and psychopathology, Nigg (2006) proposed that the pathway from frustration to aggression or externalizing behaviors can emanate from surgency (excessive approach motivation to acquire an award) or from fear (propensity toward hostile affect in response to anticipated negative consequences). To this end, Muhtadie, Zhou, Eisenberg, and Wang (2013) have pointed out that “anger/frustration is thought to reflect the function of the approach system and thus to be more directly related to aggression or externalizing problems” (p.654).

Next, in a discussion of the link between anger and physical aggression, Tremblay (2010) acknowledged that most of the aggressive behaviors that follow intense frustration are unplanned and impulsive. Tremblay (2010) also stated that the ability to inhibit anger or frustration in the face of blocked goals is something that is learned and is, in his opinion, one of the greatest developmental challenges of a child. Along these lines, Vitaro, Brendgen, and Barker (2006) have addressed that, whereas the social learning model is the leading explanation for proactive aggression (Akers, 1973; Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979), reactive aggression has its roots in frustration and anger (Berkowitz, 1989). More recently Hubbard, McAuliffe, Morrow, and Romano (2010) provided a review of the precursors and outcomes of reactive and proactive aggression, in which they expressed similar distinctions between the functions and forms of aggression. They suggested that while frustration and anger upon provocation have

historically provided an explanation for retaliatory, reactive aggression, social learning perspectives have been used to explain goal-oriented, proactive aggression and antisocial behavior. In other words, the latter involves a cognitive cost-benefit analysis, in which the benefits and the costs that reflect direct or vicarious reinforcement and punishment are calculated, rather than the aggression being driven by emotion. To support this, Moore and Gullone (1996) found that perceived pleasantness and likelihood of positive outcomes (i.e., benefits), and unpleasantness of negative outcomes (i.e., costs), were strongly associated with risky behavior including criminal and antisocial behavior. Additionally, Patterson's coercion theory (Patterson, 1982) has been described as a good example of a social learning explanation of antisocial behavior. The theory suggests that if parents withdraw demands in the face of a child's coercive tactics, they negatively reinforce antisocial (rather than cooperative or prosocial behavior), which over time leads to increases in antisocial behavior (Snyder and Patterson, 1995). Hence, parent management training programs to reduce antisocial behavior are designed to make reinforcement contingent on appropriate behavior, and punishment contingent on inappropriate behavior (Forgatch et al., 2016).

Finally, DeLisi and Vaughn (2014) proposed a temperament-based theory of crime based on more than 300 studies which collectively showed the importance of negative emotionality including anger and hostility, in predicting behavioral problems including physical aggression, violence, vandalism, and theft across the human lifespan, eventually leading to involvement in the criminal justice system. While the articles in their review involved a broader view of negative emotionality, including frustration, fear, discomfort, sadness, and soothability (i.e., there was not a pure focus on temperamental



frustration), they stated that the types of negative emotion most germane to their theory were anger, hostility, and irritability. They conceived anger as the raw material of the emotional dysregulation that accompanies situations which elicit aggressive types of conduct problems, and they reported its relation to impaired social functioning, peer rejection, and eventually substance use disorders and criminal activity in later adolescence and adulthood.

Even after a brief discussion of the theoretical bases for examining the link between frustration and antisocial behavior, however, the role of negative affect in antisocial behavior is still an open question, in that antisocial behavior may involve reactive aggression. For example, in their meta-analysis, Card and Little (2006) found “delinquency” to be equally associated with proactive and reactive aggression. And Berkowitz (2012), in his cognitive neoassociation model which is an update of the frustration-aggression model (Berkowitz, 1989; 1993), suggests that many different aversive experiences may increase the likelihood of aggression. Thus, the frustration-aggression hypothesis (Dollard, Miller, Doob, Mowrer, & Sears, 1939; Berkowitz, 1989; 1993), in addition to its corresponding literature, suggests that adolescent frustration should be positively related to antisocial behavior in the current study.

With respect to empirical justification for the current study, Dougherty et al. (2015) found that chronic irritability in three-year-old children predicted disruptive behavior disorder symptoms at age nine. Rhee et al. (2016) provide a good, recent article on the topic of frustration and behavior problems in which they found that negative emotionality, including frustration, measured before the age of 3 years old, positively related to later conduct problems between the ages of 4 and 12 years old. Previous

research shows a positive link between poor emotion regulation of negative affect and externalizing problems in 5- to 8-year-old children (Rydell, Berlin, & Bohlin, 2003), and between frustration and externalizing symptoms in pre-adolescent boys and girls (Veenstra, Lindenberg, Oldehinkel, De Winter, & Ormel, 2006) and in 9- to 13-year-olds (Muris, Meesters, & Blijlevens, 2007). In a cross-sectional study, Van Petegem, Soenens, Vansteenkiste, and Beyers (2015) found oppositional defiance, a mechanism to cope with autonomy frustration, to be related to more behavior problems in adolescents ranging in age from 14 to 21 years, and in a longitudinal study, Zhou, Main, and Wang (2008) found that anger/frustration positively predicted externalizing problems in 6- to 9-year-old children.

Yet there is an important distinction to be made between externalizing and antisocial behavior which is demonstrated in how the two constructs are measured. The ASEBA measures (Achenbach, 1991), which are commonly used to measure externalizing behaviors, include the parent-rated child behavior checklist (CBCL), the youth-rated Youth Self Report (YSR), and the Teacher Report Form (TRF), and they have a substantial number of items that address reactive aggression or oppositional behavior, although not exclusively. Many items refer to the child who is argumentative; disobedient; screams a lot; is stubborn, sullen and irritable; shows sudden changes in mood or feelings; sulks a lot; is suspicious; is prone to temper tantrums or hot temper; and is unusually loud. The Self-Reported Delinquency Questionnaire (Le Blanc & Fréchette, 1989), on the other hand, is a measure which focuses predominantly on proactive aggression (in terms of the violence items) as well as covert antisocial behaviors (in terms of the theft and vandalism items). So, while the pathway from

explosive, negative emotionality is somewhat obvious in its relation to externalizing, the possible relation between frustration and antisocial behavior is less obvious and has received less empirical attention, especially in adolescence.

In light of these theoretical considerations and empirical bases for a link between frustration and antisocial behavior, the current study aims to address some of the existing gaps by examining whether frustration predicts proactive and covert forms of antisocial behavior. As well, given that the cognitive neoassociation model suggests that any kind of aversive experience can increase anger-driven aggression (Berkowitz, 2012), in the current model, this concept is applied to the testing of the link between different dimensions of authoritative parenting and changes in antisocial behavior, including those through adolescent temperament.

### **Authoritative Parenting and Antisocial Behavior**

Authoritative parenting is comprised of three dimensions: psychological autonomy granting, acceptance-involvement, and behavioral control which includes parental knowledge and limit setting (Gray & Steinberg, 1999). Research concerning these variables has provided evidence for both contemporaneous and longitudinal relations with antisocial behavior. For example, Steinberg, Darling, and Fletcher (1995) found that adolescents raised in authoritative homes were less likely than their peers to engage in problem behaviors compared to adolescents raised in authoritarian, indulgent, and neglectful homes. Similarly, in a longitudinal study, Luyckx et al. (2011) found that children in authoritative homes scored lowest on antisocial behavior at age 6 years compared to their peers, and that across 12 yearly assessments, children in the indulgent and uninvolved homes showed the steepest increase in antisocial behavior over time

compared to those in authoritative and authoritarian homes. The current study tests direct effects of parenting on antisocial behavior, however, a primary aim is to examine the possibility of indirect effects of parenting on antisocial behavior through an intermediate relation with temperamental frustration.

### **Parenting and Frustration**

Adolescence is a developmental period marked by increasing desire for autonomy and independence from parental involvement in decision-making (Blos, 1967; Delhay et al., 2012). Accordingly, one dimension of authoritative parenting, psychological autonomy granting, may contribute to the amount of frustration adolescents experience. Psychological autonomy granting is the degree to which parents show respect for and encouragement of their child's autonomy, especially through non-coercive, democratic discipline (Gray & Steinberg, 1999; Muhtadie et al., 2013). In a large sample of 12- to 21-year-olds, Van Petegem et al. (2015) found that a psychologically controlling parenting style related to adolescents' experiences of frustration. Psychological control entails parental intrusiveness which burdens the child's individuation process and hampers their identity formation during adolescence (Barber, Olsen, & Shagle, 1994). Psychologically controlling parents use manipulation, coercion, and criticism, invalidate feelings, and withhold affection (Morris, Silk, Steinberg, Sessa, Avenevoli, & Essex, 2002) as a means of constraining their child. However, as noted by Kunz and Grych (2013), psychological autonomy granting, the variable used in the current study, is not merely the absence of psychological control, as it also involves encouraging the child to engage in self-expression and self-regulation.

In a similar manner, parental limit setting, which is an aspect of authoritative parenting, and specifically behavioral control, may be positively related to adolescent frustration. Because frustration occurs in response to the blocking of one's goals, when stricter limits are placed on an adolescent's behavior (e.g., in the form of having an earlier curfew) he or she may experience more frustration. Indeed, Veenstra et al. (2006) describe children with a high level of frustration as those who "react strongly and aversively to obstacles that prevent them from doing what they want" (p.424). Parental limit setting may prevent the adolescent from achieving his or her social goals, which often involves an increasing desire to spend time outside of the home with friends (Gecas & Seff, 1990). Conversely, adolescents whose parents allow more flexibility for the child to manage his or her own time outside the home (i.e., by giving a later curfew), should be less likely to experience frustration in response to his or her social goals. Even so, loving and authoritative parents need to give appropriate limits to their adolescent children, which may mean that children who are inherently more easily frustrated may nevertheless engage in more aggressive or antisocial behaviors.

Parental warmth and responsiveness is another dimension of authoritative parenting, referred to as acceptance-involvement, which might be related to adolescent frustration. One benefit of acceptance-involvement is the ability of parents to have a strong attachment relationship with their child (see review provided by Hong & Park, 2012). Having such a relationship affords parents the opportunity to help their child navigate some of the day-to-day frustrations they may encounter in their adolescent years (e.g., difficulties at school, or conflicts with peers). It also allows the child to be securely attached and to seek social-emotional support from others when needed. For example,

Murphy, Laible, Augustine, and Robeson (2015) found that higher levels of attachment security were associated with lower levels of negative emotionality and higher levels of emotion regulation in a sample of high school students. In a small sample of irritable infants, Sherman, Stupica, Dykas, Ramos-Marcuse, and Cassidy (2013) found no significant differences in emotional reactivity at 5 months of age as a function of attachment, but at 12 months of age, infants in the insecure-ambivalent group showed the most negative emotional reactions, followed by securely attached infants, who were followed by insecure-avoidant infants who were the least reactive. Their findings suggested that the attachment relationship relates to changes in emotional reactivity over time in infants. They also show how acceptance-involvement may reduce frustration and intense negative affect due to negative internal working models regarding self and others by not putting the child through the adversity of having rejecting or neglectful parents. Houlberg, Morris, Cui, Henry, and Criss (2016) found that parental support was positively related with anger regulation in a small sample of 7- to 15-year-old high risk boys and girls. Despite the theoretical and empirical relations between attachment and acceptance-involvement and attachment and negative emotional reactivity, it seems there is a lack of research that explores the relation between parental acceptance-involvement or warmth and responsiveness with adolescent frustration as an aspect of temperament.

Parental knowledge, which is the degree to which parents are knowledgeable concerning their adolescent's friendships, activities, and whereabouts, is usually subsumed within another main dimension of authoritative parenting, behavioral control (Gray & Steinberg, 1999). Parental knowledge includes both the parent's actual (or perceived) knowledge as well as the extent to which they try to know, perhaps through

solicitation or monitoring (Hayes, Hudson, & Matthews, 2003), with adolescent self-disclosure being the strongest predictor of parental knowledge (Stattin & Kerr, 2000). Given that adolescence is a developmental period in which children are gaining increased cognitive abilities (Paus, 2005), and desiring increased freedom outside of the home, parental efforts that may disrupt or interfere with these goals (e.g., through tracking and surveillance) may lead to greater frustration in the adolescent over time. Monitoring behaviors may be perceived by some adolescents as intrusive (Kerr & Stattin, 2000), and particularly for those adolescents who have a predisposition to negative emotionality which tends to elicit high levels of behavioral control (Omer, Satran, & Driter, 2016). Indeed, overprotective parenting has been linked with increased conflict between parent and child, and reduced satisfaction with family relations (Segrin et al., 2012). Conversely, because parental knowledge is largely predicated on adolescent self-disclosure, adolescents who are less prone to frustration may be more likely to disclose information to their parents thus increasing parental knowledge (Kerr & Stattin, 2000). Along these lines, there is research to suggest that the extent to which adolescents disclose information to parents is based on their beliefs about the legitimacy of parental authority (e.g., Tilton-Weaver, 2014; Keijsers & Laird, 2014). However, there seems to be limited research regarding the possible link between adolescent frustration as an aspect of temperament and parental knowledge or tracking.

### **Bidirectionality**

Despite the strong empirical and conceptual bases for studying the effects of parenting on frustration and antisocial behavior, there has also been evidence in more recent years that adolescent temperament and antisocial behavior have effects on

parenting (e.g., Lengua & Kovacs, 2005; Burke, Pardini, & Loeber, 2008). It can be difficult for a parent to respond to an easily frustrated, antisocial child in a patient and non-coercive manner. For example, a parent may be more apt to set stricter limits on a child who engages in antisocial behavior, or on the other hand, may be more likely to remove limits on an antisocial child to avoid parent-adolescent conflict. Hill (2002) recognized the possibility of bidirectional associations between parenting and temperament. For example, based on a parents' attributions regarding their child's temperament, a child may be perceived as being more irritable or easily frustrated, which may elicit a particular parenting response, such as increased hostility or harsher discipline. Indeed, in a study of 8- to 11-year old children, Lengua and Kovacs (2005) found that child irritability predicted greater inconsistent discipline, even controlling for prior levels of parenting and temperament. Negative parenting practices can then lead to more antisocial behavior on the part of the child. In addition, if a parent perceives their child as having a difficult temperament (e.g., high negative emotionality including frustration), it may impact the attachment style or the relationship between the parent and child, thereby increasing the risk for later conduct problems (Hill, 2002). Rutter, Moffitt, and Caspi (2006) have discussed the interplay of gene-environment correlations with respect to psychopathology.

In a recent review of bidirectional effects between parenting and temperament, Kiff, Lengua, and Zalewski (2011) report that irritable children appear to contribute to conflictual relationships with their parents, thereby engendering more negative parenting behaviors such as inconsistency, rejection, hostility, and harshness. These negative parenting behaviors in turn place the child at greater risk for involvement in antisocial



behaviors. Although the findings come from infant/toddler and middle childhood studies with participants up to the age of 12 years, similar transactional processes likely pertain to adolescent samples as well. Yet there does not seem to be research exploring these relations, especially with the possibility of an intervening variable, namely antisocial behavior, during adolescence. Thus, the current study makes a unique contribution to the literature, by analyzing a second model in which adolescent frustration was expected to relate to more antisocial behavior over time which was expected to relate negatively to authoritative parenting dimensions.

### **The Current Study**

The first model suggests that authoritative parenting is related to antisocial behavior through adolescent temperament, namely frustration. Thus, it was hypothesized that authoritative parenting dimensions (psychological autonomy granting, acceptance-involvement, and aspects of behavioral control such as knowledge, tracking, and limit-setting) would be individually related to frustration over time, which would itself be related to antisocial behavior in a community sample of male and female adolescents. More specifically, because frustration involves the negative affect experienced when one's goals are blocked, parenting practices that consistently disregard adolescents' opinions and desires, thoughts and emotions likely contribute to more adolescent frustration over time. In contrast, adolescents should be less likely to experience frustration when parents show appropriate consideration of their adolescents' preferences and ideas, and allow them to make their own plans. Thus, the parenting dimensions that were expected to be most closely associated with frustration were psychological autonomy granting and limit-setting, given the nature of these dimensions to represent

external forms of control and regulation on the adolescents' autonomy and goal-directed behaviors. It was expected that, over time, psychological autonomy granting would be inversely related with frustration, because adolescents would perceive that their ideas and opinions were taken seriously and respected by their parents. It was hypothesized that relational dimensions of parenting, acceptance-involvement and knowledge, would be negatively related to frustration, because these dimensions may signify a stronger parent-child relationship, one founded on trust and open communication (Kerr, Stattin, & Trost, 1999). High acceptance-involvement and parental knowledge also may suggest that the parent-child relationship is more harmonious and less conflictual, which should lead to less frustration. Tracking and limit setting were expected to be positively related to frustration.

The second model tests whether adolescent frustration is indirectly related to authoritative parenting through its intermediate effect on antisocial behavior. It was hypothesized that frustration at time 1 would lead to increased antisocial behavior at time 2, which would be related to lower levels of authoritative parenting, specifically, lower psychological autonomy granting, acceptance-involvement, knowledge.

## **Method**

### **Participants**

Data for Study 3 were obtained from a larger dataset ( $N = 1179$ ) that was collected for a research initiative which focused on youth gambling and related risk factors (Dane, McPhee, Root, & Derevensky, 2004). Analyses for the proposed study will be based on a community sample of adolescents ( $N = 521$ , 55% female) ranging in age from 10 to 15 years old ( $M_{age} = 12.95$  years,  $SD = 1.60$ ) at the time of the first survey

completion and between the ages of 11 and 17 at time 2. Most adolescent participants (95%) lived with their mother; 73% lived with both parents at the time of the first assessment, and 22% lived with their mother in some other type of family arrangement (mother only, mother and step-father, mother and partner). Because of the preponderance of children living with their mothers, and because of the near complete data collected from mothers (97%), the data collected from mothers but not fathers were included in this study.

Many of the mother participants (77%) indicated their families were Canadian in ethnicity and culture, and 23% indicated their families belonged to a different ethnicity or culture. The most common responses of those who specified the ethnicity or culture with which they identified were citizens of the United States (2.2%) and identification with various European countries (14.9%). Very few indicated Asian (1.2%), Aboriginal (0.6%), and African (0.2%) descent. The modal response (accounting for approximately 15% of families) for household income before taxes in the previous year was \$50,000-\$60,000; 30% fell below this income level, and 55% were above this income level.

## **Procedure**

Adolescent participants and their parents responded to questionnaires at two times with a span of approximately 18 months between assessments. Participants were recruited from the community through random digit dialing, and survey packages were mailed out and mailed back to the investigators. Participants were given \$20 for their participation. Data from mother and adolescent reports were sometimes kept as separate variables to account for possible differences in perspectives (e.g., report of parenting), but were

combined where indicated by theory or methodological concerns (e.g., report of frustration).

### **Missing Data**

See Study 1 for a description of the missing values analysis. In this case, Little's MCAR test included gender as a categorical variable (i.e., male or female), parenting dimensions, frustration, and antisocial behavior at waves 1 and 2, and age as continuous variables. The chi square result was nonsignificant, which meant failure to reject the null hypothesis, thereby suggesting that data were not missing for systematic reasons.

As in Study 1, an independent samples *t*-test was used, in this case, to compare the means of wave 1 parenting, frustration, and antisocial behavior of those participants from wave 1 ( $N = 521$ ) who continued in the study ( $n = 254$ ) to those who discontinued ( $n = 267$ ). There were no significant differences found between the two groups for psychological autonomy granting, acceptance-involvement, knowledge, tracking, or limit setting. As well, there were no significant differences found between those who continued and those who discontinued for frustration or antisocial behavior. These results suggest that there is no relationship between the missingness of the data and the data, and that common methods for handling missing data can be used. Thus, expectation-maximization was used to allow for the use of the bootstrapping method in testing indirect effects.

### **Measures**

The study's measures are described below. Refer to Table 4.1 for additional information concerning descriptive statistics.

**Demographic information.** Adolescents reported information at Time 1 regarding their age in years, their gender whether male or female, and who they lived with the most (e.g., mother and father, etc.). Household income was reported by mothers but was not included in the analyses.

**Authoritative parenting.** Authoritative parenting was rated by adolescents and mothers at both waves using the Authoritative Parenting measure (Gray & Steinberg, 1999) which includes three subscales, psychological autonomy granting, acceptance-involvement, and behavioral supervision and strictness (also referred to as monitoring knowledge). The parent version included the same subscales and similar items as the adolescent version but it was worded to reflect how mothers perceived their own parenting behaviors. A scale measuring self-disclosure (Stattin & Kerr, 2000) was also included in the questionnaire package for youth but not their mothers.

***Psychological autonomy granting.*** The psychological autonomy granting subscale measures the extent to which adolescents perceive that their mothers employ non-coercive, democratic discipline and encourage the adolescent to express individuality within the family. A sample item is “She lets me make my own plans for things I want to do.” Adolescents indicate on a 4-point scale the extent to which they agree with the items. The other items that comprise this subscale were reverse coded so that high scores reflect high levels of psychological autonomy granting. Internal consistency for this 9-item subscale was good (Time 1  $\alpha = .72$ , Time 2  $\alpha = .73$ ). Based on mother report, the alpha coefficients for time 1 and 2 were .68 and .67 respectively.

***Acceptance-involvement.*** For the adolescent version, the acceptance-involvement subscale measures the extent to which adolescents perceive their mothers as loving,

responsive, and involved. A sample item is “She helps me with my schoolwork if there is something I don’t understand” to which adolescents could indicate that they (1) strongly disagree, (2) disagree somewhat, (3) agree somewhat, or (4) strongly agree. There are 9 items in this subscale, and the internal consistency was good (Time 1  $\alpha = .80$ , Time 2  $\alpha = .79$ ). Based on mother-reported parenting, reliability for acceptance-involvement was .64 at time 1 and 2.

***Monitoring Knowledge.*** The supervision and strictness subscale measures the extent to which adolescents perceive their mothers as being knowledgeable about how they spend their time outside of school and with peers, the extent to which mothers try to know about how their children spend their time outside of school and with peers, and the extent to which limits are placed on adolescents’ time spent outside of school and the home.

***Knowledge.*** A sample item measuring parental knowledge is “How much does your mother really know what you do with your free time?” Respondents could indicate that (1) she never knows, (2) she sometimes knows, (3) she usually knows, or (4) she always knows. Internal consistency of this subscale was good at time 1 ( $\alpha = .83$ ) and time 2 ( $\alpha = .80$ ) for adolescents, and for mother-reported knowledge (Time 1  $\alpha = .79$ , Time 2  $\alpha = .80$ ).

Adolescents, but not mothers, also responded to five items assessing self-disclosure (Stattin & Kerr, 2000). Reliability for this scale was good (Time 1  $\alpha = .79$ , Time 2  $\alpha = .82$ ). This scale was combined with the knowledge items to create a parental knowledge composite, which had good reliability (Time 1  $\alpha = .84$ , Time 2  $\alpha = .87$ ).

*Tracking.* There were also three items to assess tracking such as “How much does she try to know?” which is more reflective of parental monitoring behaviors such as solicitation or surveillance. Internal consistency of this subscale was good for adolescent (Time 1  $\alpha = .84$ , Time 2  $\alpha = .78$ ) and mother (Time 1  $\alpha = .83$ , Time 2  $\alpha = .70$ ) reports.

*Limit setting.* Adolescents were asked how late they were allowed to stay out on weekends and weeknights as a measure of parental limit setting. Based on adolescent report of two items, reliability for the first wave was .78 and .84 for the second wave, and was .79 and .81 based on mother-reported limit setting at waves 1 and 2 respectively.

**Frustration.** At waves one and two, adolescents responded to the Early Adolescent Temperament Questionnaire – Revised (EATQ-R; Ellis & Rothbart, 2001) which includes seven items on the Frustration subscale. For each item, adolescents reported how true the statement was of themselves, indicating (1) “almost always untrue”, (2) “usually untrue”, (3) sometimes true, sometimes untrue”, (4) “usually true”, or (5) “almost always true”. The frustration subscale reflects one’s proneness to frustration or irritation upon the blocking of his or her goal. An example item of this subscale is, “I get very upset if my parents won’t let me do something I want to.” The measure had a high level of internal consistency at time 1 ( $\alpha = .68$ ) and time 2 ( $\alpha = .72$ ).

Mothers reported their child’s frustration by responding to the Early Adolescent Temperament Questionnaire – Parent Report. For each of six items, they indicated how true the statement was of their adolescent child on a Likert scale. High scores reflected more adolescent frustration. Internal consistency based on mother-reported frustration was .68 for time 1 and .69 for time 2. When mother and adolescent scales of frustration were combined, internal consistency was .70 and .72 at time 1 and 2 respectively.

**Adolescent antisocial behavior.** The Self-Reported Delinquency Questionnaire (SRDQ; Le Blanc & Fréchette, 1989) was used to measure the frequency with which adolescents were involved in antisocial behavior according to their own report. The SRDQ contains nineteen items that tap antisocial behaviors of differing kinds and degrees of severity, but it is important to note that scores from this measure are not meant to reflect overall seriousness or variety. At time 1 the overall scale reliability was .80 and at time 2 its reliability was .92. The scale includes three subscales, violence, theft, and vandalism.

The Violence subscale is comprised of seven items that indicate how often adolescents participated in overt (i.e., aggressive, confrontational) forms of antisocial behavior in the past year. A sample item from the Violence subscale is “In the past year, how often have you used a weapon (stick, knife, gun, rocks) in fighting with someone else?” The Theft and Vandalism subscales, comprised of eight and four items respectively, indicate how often adolescents participated in covert (i.e., non-aggressive, concealed) forms of antisocial behavior in the past year. A sample question from the Theft subscale is “In the past year, how often have you taken and kept something from a store without paying?” A sample question from the Vandalism subscale is “In the past year, how often have you purposely broken or destroyed something belonging to your parents or another family member?” Adolescents could indicate (1) never, (2) once or twice, (3) several times, or (4) quite often. Because the distribution of the antisocial behavior variable was highly skewed and kurtotic, a transformation of the data was applied to improve the normality of its distribution.



**Table 4.1***Means and Standard Deviations of Study Variables and Inter-rater Correlations*

<b>Variable</b>	<b>Mother</b>		<b>Adolescent</b>		<b><i>r</i></b>
	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>M</i></b>	<b><i>SD</i></b>	
Gender (female)			55%		
Age (years)			12.95	1.60	
Psychological Autonomy Granting-1	3.00	.41	2.79	.53	.40**
Psychological Autonomy Granting-2	3.06	.39	2.83	.53	.41**
Acceptance-Involvement-1	3.66	.28	3.40	.47	.30**
Acceptance-Involvement-2	3.63	.27	3.31	.47	.41**
Knowledge-1	3.78	.37	3.30	.56	.28**
Knowledge-2	3.69	.40	3.38	.62	.42**
Tracking-1	3.80	.50	2.95	.99	.20**
Tracking-2	3.80	.39	3.08	.85	.18**
Limit Setting-1	4.56	1.12	4.28	1.32	.67**
Limit Setting-2	3.87	1.17	3.57	1.35	.84**
Frustration-1 (combined)			3.26	.50	
Frustration-2 (combined)			3.24	.42	
Antisocial Behavior-1	-	-	1.14	.21	
Antisocial Behavior-2	-	-	1.20	.31	

*Note.* Means, standard deviations, and correlations were calculated using SPSS 22. Numbers 1 and 2 refer to assessments at times 1 and 2. Parenting scale ranged from 1-4 but limit-setting subscale ranged from 1-7. Adolescent report of knowledge included self-disclosure. Temperament (frustration) scale ranged from 1-5 and is the combined (averaged) score of mother and adolescent report. Antisocial behavior scale ranged from 1-4 and used adolescent report only. \*\*  $p < .01$

## Plan of Analyses

All statistical analyses were performed using SPSS Statistics 22 and SPSS Amos 22. The mean variables were computed for the parenting dimensions, frustration composite, and self-reported adolescent antisocial behavior scores for which there were at least 50% of the data present in any given variable by summing and averaging the values provided. Global fit indices were used to evaluate the goodness-of-fit for each model. Specifically, root mean square error of approximation (RMSEA) and the comparative fit index (CFI) were reviewed. Taken together, a RMSEA value less than .06 and a CFI value greater than .95 were considered to suggest good model fit (Hu & Bentler, 1999).

**Measuring frustration.** Many studies of temperament that involve children and even adolescents rely on parental report of the child's temperament. For instance, Oldehinkel, Hartman, De Winter, Veenstra, and Ormel (2004) used the parent version of the EATQ-R in their study because it was preferable in light of the data they were analyzing. However, as adolescents mature emotionally and cognitively, they are able to provide reliable reports of their own temperament. Scale reliability for the Early Adolescent Temperament Questionnaire-Revised was assessed in a sample of 10- to 16-year-olds ( $N = 177$ ) and their parents (Ellis & Rothbart, 2001). The alpha coefficient of the inter-item correlations for Frustration was .70 for adolescent-report and .74 for the parent report form. Also, the parents' and adolescents' scores were significantly correlated ( $r = .29, p < .05$ ). In the current study, adolescent and mother reported frustration are combined to create a composite variable of frustration. This allows for the measure to incorporate two different perspectives, so that it is not limited by biases inherent in any one perspective. Also, using a composite of temperament reduces the

problem of shared method variance in relation to measures that are either parent-reported or self-reported.

**Parent-led model.** To test whether frustration is an intervening variable in the relation between parenting and antisocial behavior, a series of path analyses were conducted in which Time 1 correlations between study variables and autoregressive paths of frustration and antisocial behavior were estimated (Bollen & Curran, 2006). The direct relations between each of the five parenting dimensions at Time 1 with frustration and antisocial behavior at Time 2 were estimated simultaneously. The indirect paths from each of the parenting variables at time 1 to antisocial behavior at time 2 through frustration at time 2 were also included. These analyses were conducted separately for mother and adolescent reports of parenting. These types of analyses can show the extent to which parenting predicts changes in adolescent frustration and antisocial behavior and possible indirect effects, by controlling for age, and stability effects of the mediator and outcome variables.

**Adolescent-led model.** An alternate model testing the possibility of an indirect effect between frustration and parenting through antisocial behavior was conducted. In the path diagrams, the within-time correlations for the exogenous variables and the error terms for the endogenous variables were assumed to covary. Also, age is included in the models as a covariate with double-headed arrows drawn between age and time 1 study variables. The possibility that gender moderated the results was examined.

## Results

### Preliminary Analyses

**Assumptions.** The assumption of normality and the possibility of outlying values were assessed by examining the appropriate skewness and kurtosis statistics, standardized

scores, and histograms for each variable. See Study 1 for more information regarding the distribution of antisocial behavior and the transformation applied to normalize the distribution.

Parenting, frustration, and antisocial behavior are generally correlated. The zero-order correlations between the key study variables are shown in Tables 4.2 and 4.3. Of the parenting dimensions, psychological autonomy granting was negatively related with adolescent frustration, and adolescent-reported knowledge had one small significant negative correlation with frustration. Frustration was positively related to antisocial behavior. Because of these correlations, in estimating the path diagrams, the within-time correlations for the exogenous variables and the error terms for the endogenous variables were assumed to covary.

**Differentiated and composite variables.** Exploratory factor analyses were conducted in SPSS using the psychological autonomy granting, acceptance-involvement, knowledge, tracking, self-disclosure, and limit setting items based on wave 1 adolescent report, and wave 1 mother report with the exception of the self-disclosure items. See Study 1 for a description of the results which led to the decision to use a differentiated, five-factor model of parenting.

**Temperament composite.** In the current study, mothers and adolescents reported adolescent frustration at both waves. At wave 1, the correlation between mother and adolescent report for frustration was small but significant ( $r = .20, p < .001$ ). At wave 2, the correlation between mother and adolescent report for frustration was slightly higher ( $r = .26, p < .001$ ). At both waves, mothers reported lower levels of frustration on average than the adolescents, while self-reports suggested more frustration, and the mean

differences were statistically significant. Despite some apparent differences in perspective, it was decided to combine the mother and adolescent reports in order to produce a variable that capitalizes on the strengths of the two different vantage points, because the mother has had the opportunity to observe the child's temperament with a long-term perspective, whereas the adolescent has the benefit of understanding how he or she typically responds and interacts with others outside the observation of his or her mother. Combining mother-rated and adolescent self-reported measures of temperament also addresses problems associated with shared method variance that would otherwise occur, because the antisocial behavior measure was a self-report, and both parent-rated and self-reported measures of parenting were examined in the analyses. When mother and adolescent scales of frustration were combined, internal consistency was adequate (.70 and .72 at time 1 and 2, respectively).

**Gender differences.** At the first wave, male participants reported, on average, greater frequency of involvement in antisocial behavior ( $M = .15$ ,  $SD = .17$ ) than female participants ( $M = .09$ ,  $SD = .15$ ), and the difference was statistically significant ( $t(517) = 4.32$ ,  $p < .001$ ). At the second wave, male participants reported greater frequency of involvement in antisocial behavior ( $M = .18$ ,  $SD = .21$ ) than female participants ( $M = .14$ ,  $SD = .19$ ), but the difference was nonsignificant ( $t(251) = 1.87$ ,  $p = .063$ ). Despite these differences in mean levels of antisocial behavior for boys and girls, no predictions were made about differences in the nature of the relations between the study variables based on gender. At least some portion of the girls and some portion of the boys reported engaging in each of the antisocial behaviors described in the SRDQ (see Table 2.4). Nonetheless, in case of possible gender differences, analyses were performed for an unconstrained

model, and a model in which the across-time paths were constrained to be equal for boys and girls. Chi-square difference tests compared the two models to see whether gender moderated the results (if the null hypothesis was not rejected, the two models fit the data equally well and the results were not significantly different between boys and girls).

**Table 4.2***Correlations among Key Study Variables Across the Two Waves of the Study – Adolescent-Reported Parenting*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. PAG-1	---															
2. PAG-2	.64**	---														
3. AI-1	.24**	.24**	---													
4. AI-2	.25**	.34**	.70**	---												
5. Know-1	.25**	.10*	.56**	.40**	---											
6. Know-2	.15**	.18**	.50**	.60**	.61**	---										
7. Track-1	-.02	-.03	.29**	.27**	.25**	.18**	---									
8. Track-2	.04	-.01	.25**	.29**	.26**	.39**	.51**	---								
9. LS-A1	.07	-.06	.21**	.12**	.28**	.25**	.01	.07	---							
10. LS-A2	.07	.00	.27**	.29**	.32**	.34**	-.00	.08	.74**	---						
11. FRUS-1	-.23**	-.13**	-.13**	-.13**	-.07	-.06	-.02	-.06	-.01	.02	---					
12. FRUS-2	-.25**	-.28**	-.10*	-.14**	-.17**	-.14**	-.04	-.03	-.00	-.04	.70**	---				
13. AB-A1	-.19**	-.11*	-.24**	-.20**	-.48**	-.42**	-.05	-.16**	-.28**	-.20**	.11*	.21**	---			
14. AB-A2	-.14**	-.13**	-.26**	-.28**	-.46**	-.54**	-.07	-.21**	-.35**	-.30**	.16**	.24**	.65**	---		
15. Age	-.12**	-.06	-.17**	-.20**	-.21**	-.22**	.10*	.08	-.55**	-.70**	-.10	.06	.24**	.22**	---	
16. Gender	.01	.08	-.04	-.01	.16**	.15**	.08	.09*	.07	.03	.06	.04	-.19**	-.13**	-.04	---

*Note.* Correlations were calculated using SPSS Statistics 22. PAG refers to psychological autonomy granting. AI refers to acceptance-involvement. Know refers to parental knowledge. LS refers to limit setting. FRUS refers to frustration. AB refers to antisocial behavior. 1 and 2 refers to times of measurement. \*\*= $p < .01$ , \*= $p < .05$ .

Table 4.3

*Correlations among Key Study Variables across the Two Waves of the Study – Mother-Reported Parenting*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. PAG-1	---															
2. PAG-2	.77**	---														
3. AI-1	.10*	-.01	---													
4. AI-2	.08	.03	.63**	---												
5. Know-1	.13**	.07	.30**	.41**	---											
6. Know-2	.13**	.14**	.35**	.54**	.62**	---										
7. Track-1	-.11**	-.13**	.15**	.16**	.30**	.02	---									
8. Track-2	-.11*	-.08	.16**	.31**	.27**	.45**	.23**	---								
9. LS-1	.07	.09*	.05	.09	.17**	.34**	-.12**	.19**	---							
10. LS-2	.03	.06	.12**	.23**	.35**	.46**	.01	.25**	.74**	---						
11. FRUS-1	-.27**	-.20**	-.06	-.09*	-.08	-.13**	.00	-.05	.01	-.02	---					
12. FRUS-2	-.32**	-.32**	-.11*	-.08	-.14**	-.18**	-.03	-.07	-.01	-.12**	.70**	---				
13. AB-1	-.11*	-.07	-.17**	-.15**	-.27**	-.39**	.01	-.10*	-.26**	-.25**	.11*	.21**	---			
14. AB-2	-.10*	-.05	-.11*	-.20**	-.28**	-.40**	.03	-.09*	-.25**	-.28**	.16**	.24**	.65**	---		
15. Age	-.04	-.10*	-.04	-.15**	-.16**	-.39**	.10*	-.16**	-.59**	-.74**	-.10*	.06	.24**	.22**	---	
16. Gender	.01	.11*	-.02	.05	.12**	.12**	.11*	.08	.04	.03	.06	.04	-.19**	-.13**	-.04	---

*Note.* Correlations were calculated using SPSS Statistics 22. PAG refers to psychological autonomy granting. AI refers to acceptance-involvement. Know refers to parental knowledge. Track refers to tracking. LS refers to limit setting. FRUS refers to frustration. AB refers to antisocial behavior. 1 and 2 refers to times 1 and 2 of measurement. \*\*= $p < .01$ , \*= $p < .05$ .



## Main Analyses

Results for the hypothesized and alternate models are reported first according to the adolescent report of parenting, and then according to the mother report of parenting.

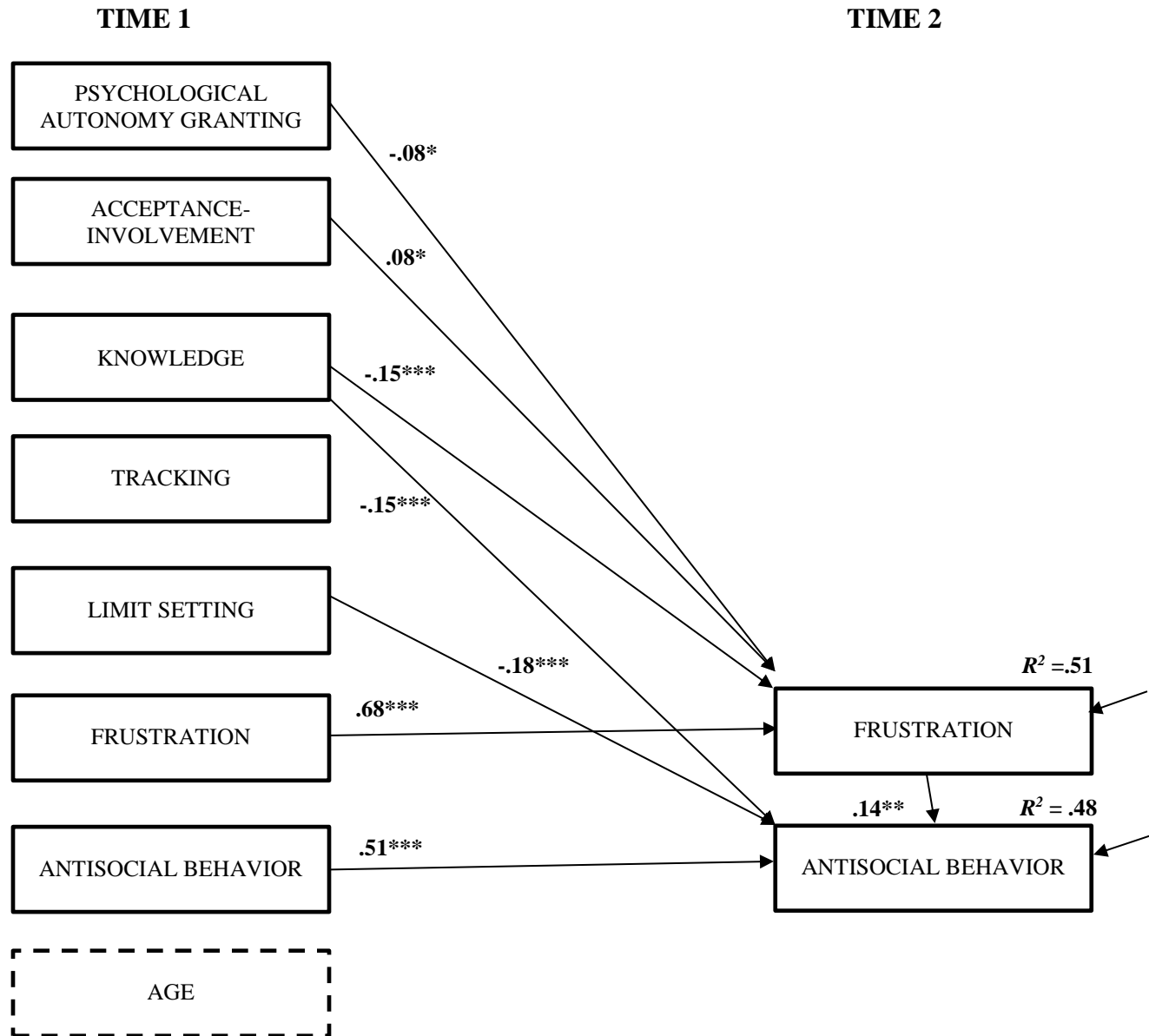
**Hypothesized model based on adolescent report of parenting.** The diagram for this model is shown in Figure 4.1. In this model, the covariate age did not predict antisocial behavior over time. There was a high autoregressive effect found for frustration ( $\beta = .679, p < .001$ ), and a moderate effect found for the stability of antisocial behavior ( $\beta = .514, p < .001$ ). As expected, frustration at time 2 related positively to antisocial behavior at time 2 ( $\beta = .143, p < .001$ ) controlling for antisocial behavior at time 1. The fit indices suggested good fit (CFI = .995) and moderate fit (RMSEA = .071, 90%CI = .043-.104).

With respect to direct effects between the parenting dimensions and antisocial behavior over time, above and beyond the effects of frustration, parental knowledge at time 1 was negatively related to antisocial behavior at time 2 ( $\beta = -.149, p < .001$ ). Limit setting at time 1 was also negatively related to antisocial behavior at time 2 ( $\beta = -.182, p < .001$ ). Psychological autonomy granting, acceptance-involvement, and tracking were not directly related to antisocial behavior over time, when controlling for initial levels of antisocial behavior and time 2 frustration.

In terms of the relations between parenting and frustration over time, psychological autonomy granting, acceptance-involvement, and parental knowledge all had significant effects. As predicted, psychological autonomy granting at time 1 related negatively to frustration at time 2 ( $\beta = -.083, p < .05$ ) so that adolescents showed decreases in frustration when they were granted more psychological autonomy. Parental knowledge at time 1 was significantly related to less frustration at time 2 ( $\beta = -.147, p <$

.001), so that adolescents who rated their mothers as more knowledgeable about their activities and whereabouts tended to be less frustrated over time. The unique effect of acceptance-involvement at time 1 on frustration at time 2 was found to be positive ( $\beta = .083, p < .05$ ), so that adolescents who rated their mothers as having more acceptance-involvement were more frustrated over time.

As hypothesized, there was a significant indirect effect between psychological autonomy granting and antisocial behavior over time through frustration, and the effect was negative so that greater adolescent-reported psychological autonomy granting related to less frustration over time which related to lower scores on antisocial behavior ( $\beta = -.012, p < .01$ ). There was also a significant indirect effect between parental knowledge and antisocial behavior over time through frustration, and the effect was negative so that more knowledge related to less frustration over time which related to lower levels of antisocial behavior ( $\beta = -.021, p < .01$ ). Finally, acceptance-involvement at time 1 was positively indirectly related to antisocial behavior at time 2 through frustration at time 2 ( $\beta = .012, p < .05$ ), so that more acceptance-involvement related to more frustration over time which related to more antisocial behavior.



**Figure 4.1.** Diagram of significant paths and squared correlations for hypothesized model based on adolescent-reported parenting

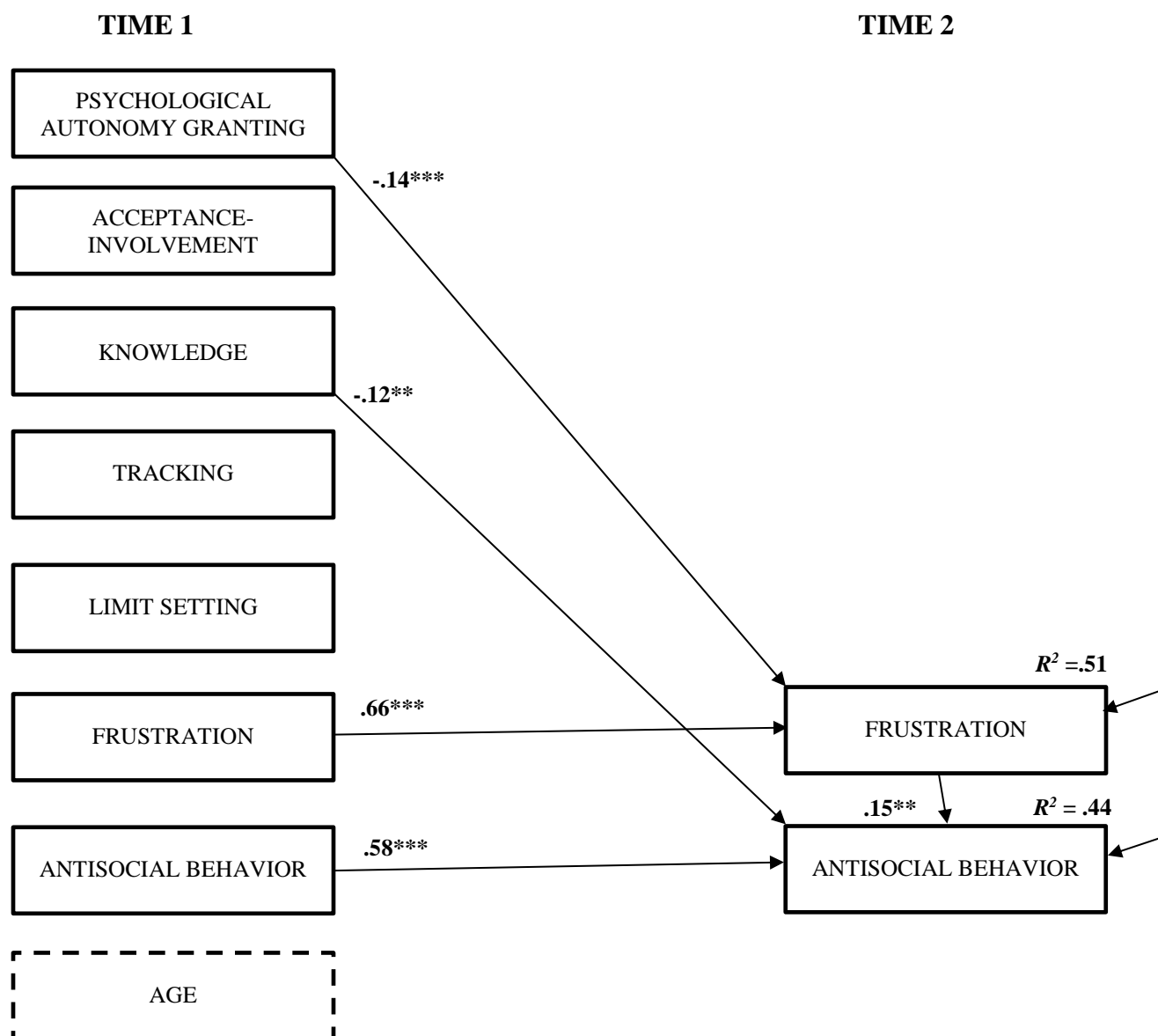
*Note.* Values indicate standardized beta weights. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . The covariate is indicated by a dashed rectangle, and was allowed to covary with the time 1 variables (double-headed arrows not pictured here), and a single-headed arrow was drawn to time 2 Antisocial Behavior but the path was non-significant. Error terms at time 2 were allowed to covary (double-headed arrow not pictured here).

**Hypothesized model using mother report of parenting.** The path diagram for this model is shown in Figure 4.2. The model fit indices implied good fit ( $CFI = .990$ ) and moderate fit ( $RMSEA = .087$ ,  $90\%CI = .058-.119$ ). The covariate age at time 1 did not predict antisocial behavior at time 2.

In terms of direct effects between parenting and antisocial behavior, knowledge was the only parenting variable that had a significant direct effect on antisocial behavior taking into account initial levels of antisocial behavior. Maternal knowledge at time 1 was negatively related to antisocial behavior at time 2 ( $\beta = -.121$ ,  $p < .01$ ). Psychological autonomy granting, acceptance-involvement, tracking, and limit setting did not have significant effects on antisocial behavior over time. The stability of antisocial behavior was high ( $\beta = .582$ ,  $p < .001$ ).

In terms of hypothesized effects between parenting and frustration, psychological autonomy granting at time 1 was negatively related to frustration at time 2, as predicted ( $\beta = -.136$ ,  $p < .001$ ). None of the other parenting variables, however, including limit setting, were related to frustration over time when controlling for initial levels of frustration. This may be due in part to the high stability of frustration ( $\beta = .656$ ,  $p < .001$ ).

As predicted, frustration at time 2 was positively related to antisocial behavior at time 2 ( $\beta = .153$ ,  $p < .01$ ). With respect to indirect effects of parenting on antisocial behavior through frustration, psychological autonomy granting had a significant indirect effect, so that more psychological autonomy granting at time 1 was related to less frustration at time 2 which was related to lower involvement in antisocial behavior ( $\beta = -.021$ ,  $p < .01$ ).



**Figure 4.2.** Diagram of significant paths and squared correlations for hypothesized model based on mother-reported parenting

*Note.* Values indicate standardized beta weights. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . The covariate is indicated by a dashed rectangle, and was allowed to covary with the time 1 variables (double-headed arrows not pictured here), and a single-headed arrow was drawn to time 2 Antisocial Behavior but the path was non-significant. Error terms at time 2 were allowed to covary (double-headed arrow not pictured here).

**Table 4.4**

*Summary table of standardized beta coefficients, standard errors, and probability levels of direct effects for hypothesized models based on mother and adolescent reports of parenting*

Path	Mother			Adolescent		
	$\beta$	$SE$	$p$	$\beta$	$SE$	$p$
PAG1→FRUS2	-.136	.033	<.001	-.083	.026	.011
PAG1→AB2	.038	.014	.308	.038	.011	.281
AI1→FRUS2	-.036	.049	.270	.083	.034	.030
AI1→AB2	.038	.020	.278	-.014	.013	.733
Know1→FRUS2	-.048	.039	.160	-.147	.029	<.001
Know1→AB2	-.121	.016	.001	-.149	.012	<.001
Track1→FRUS2	-.029	.028	.379	-.011	.014	.736
Track1→AB2	.047	.011	.184	.007	.005	.828
LS1→FRUS2	-.004	.012	.897	.029	.010	.364
LS1→AB2	-.066	.006	.110	-.182	.005	<.001
FRUS1→FRUS2	.656	.026	<.001	.679	.026	<.001
FRUS2→AB2	.153	.019	.003	.143	.018	.002
AB1→AB2	.582	.035	<.001	.514	.037	<.001

*Note.* PAG = psychological autonomy granting, AI = acceptance-involvement, Know = knowledge, Track = tracking, LS = limit setting, FRUS = frustration, AB = antisocial behavior. 1 and 2 refer to the two times of measurement.

### Alternate Analyses

Because of research which suggests that the relation between parenting and adolescent temperament and behavior is bidirectional, an alternate model examined the possible indirect relation between adolescent frustration at time 1 and authoritative parenting at time 2 through antisocial behavior at time 2. Autoregressive paths of antisocial behavior and each of the parenting dimensions were included, as were the direct paths from time 1 frustration to time 2 authoritative parenting.

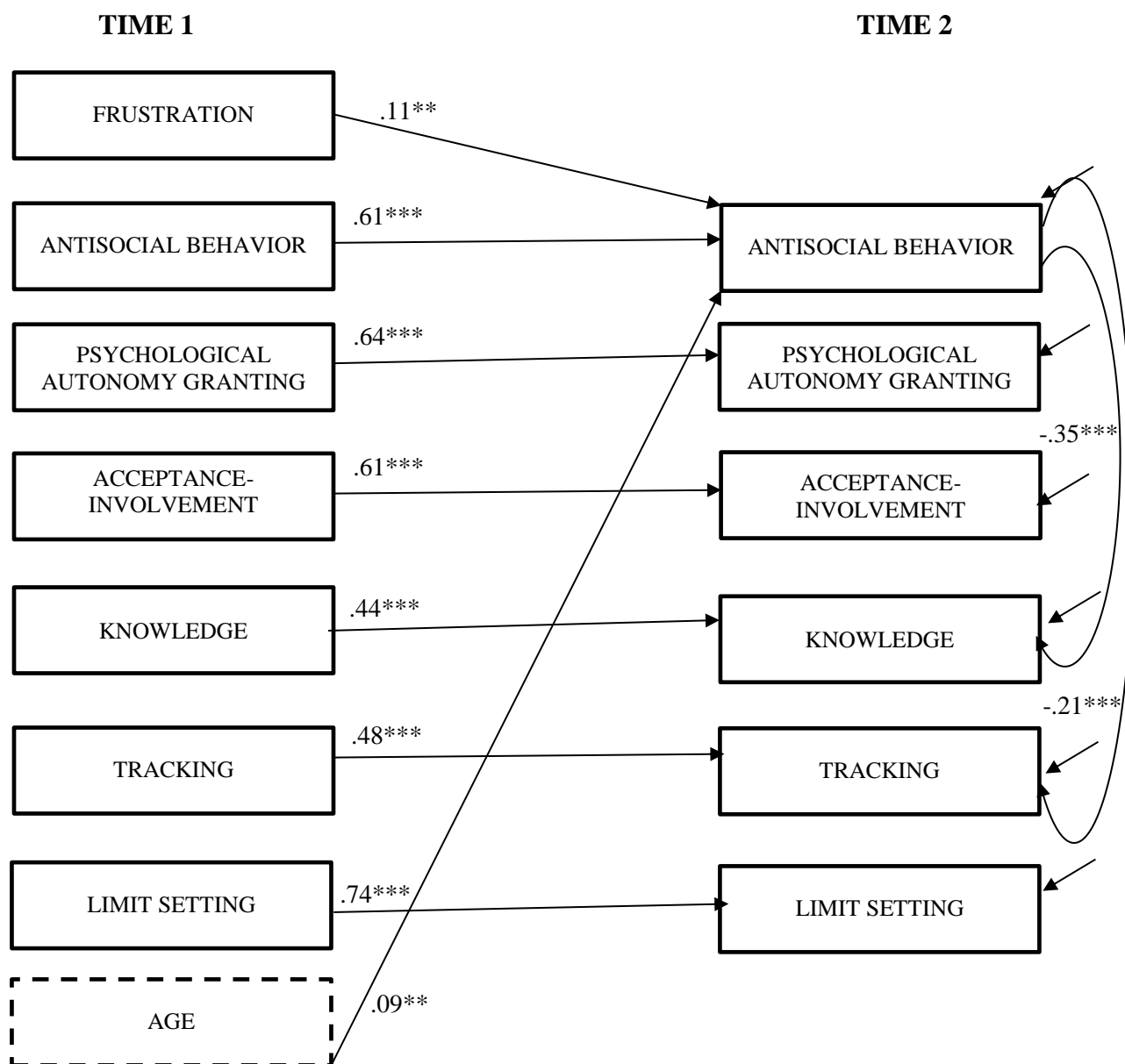
**Alternate model using adolescent report.** The path diagram for this model is shown in Figure 4.3. Model fit indices for this model suggested good fit (CFI = .954; RMSEA = .061, 90%CI = .055-.067). All the parenting variables and antisocial behavior showed high stability over time. The covariate, age at time 1, significantly related to more antisocial behavior at time 2 ( $\beta = .091, p < .01$ ).

The direct effects of frustration at time 1 on each of the parenting dimensions at time 2 controlling for their high stability were non-significant. In other words, adolescent-reported parenting did not change as a result of adolescent frustration.

However, as expected, frustration at time 1 uniquely predicted time 2 antisocial behavior ( $\beta = .107, p < .01$ ) above and beyond the autoregressive effect of antisocial behavior ( $\beta = .612, p < .001$ ) so that adolescents rated as being more easily frustrated engaged in more antisocial behavior over time. At time 2, antisocial behavior was negatively related to parental knowledge and tracking ( $\beta = -.353, p < .001$  and  $\beta = -.210, p < .001$ ), so that mothers of antisocial youth were reported as being less knowledgeable and soliciting information less frequently, given that effects controlled for autoregressive correlations.

In terms of indirect effects, adolescent frustration at time 1 was indirectly related to both tracking and parental knowledge at time 2 through time 2 antisocial behavior ( $\beta = -.022, p < .05$  and  $\beta = -.038, p < .05$ ). The effects were such that adolescents who showed higher frustration at time 1 engaged in more antisocial behavior at time 2 at which time mothers had less knowledge of their child's activities, friendships, and whereabouts, and engaged in less tracking behaviors with their adolescent children.





**Figure 4.3.** Diagram of significant paths and squared correlations for alternate model based on adolescent-reported parenting

*Note.* Values indicate standardized beta weights. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . The covariate is indicated by a dashed rectangle, and was allowed to covary with the time 1 variables and time 2 error terms (double-headed arrows not pictured here). Error terms at time 2 were allowed to covary (double-headed arrow not pictured here).

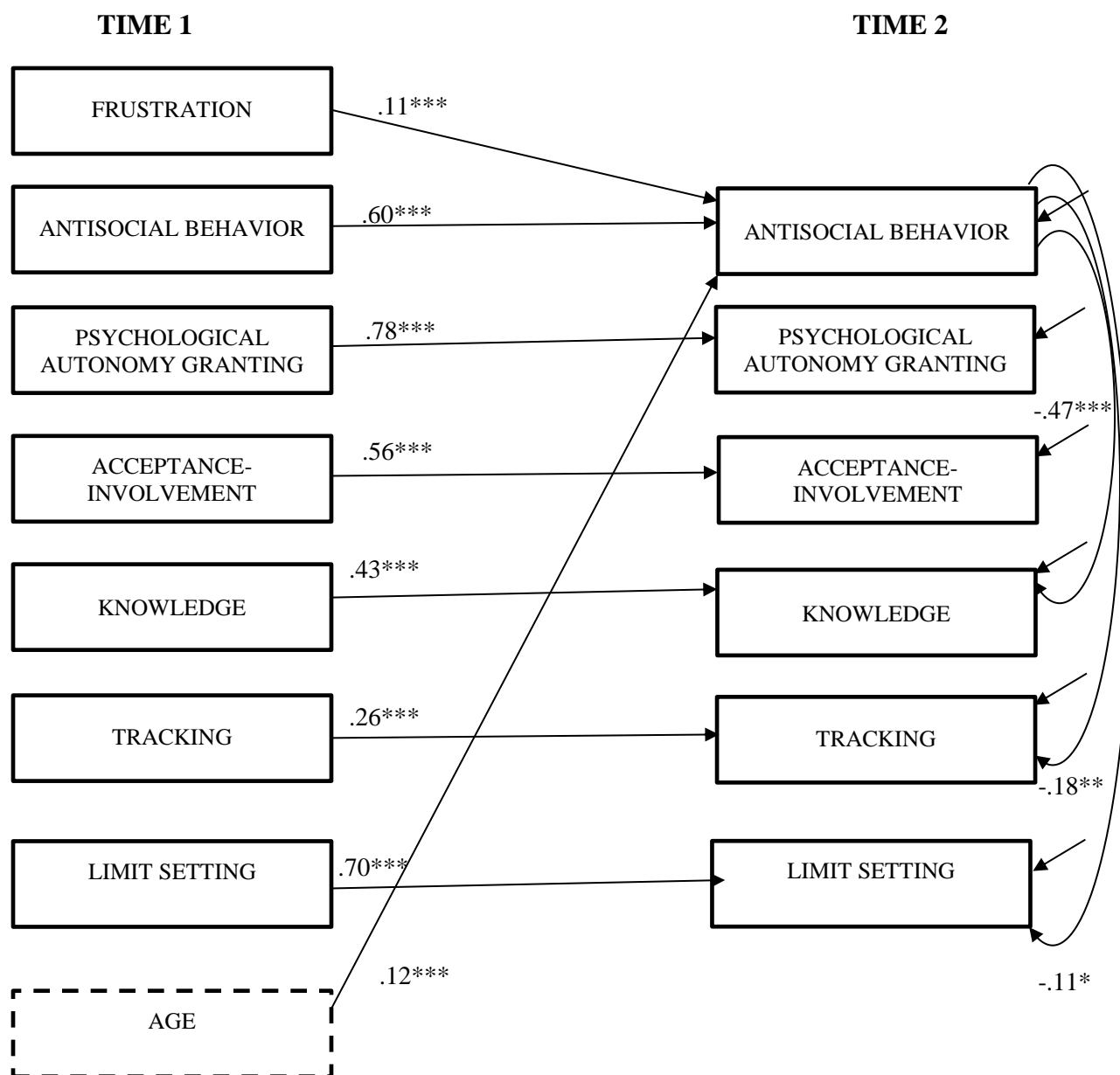
**Alternate model using mother report.** The path diagram for this model is shown in Figure 4.4. This model examined whether adolescent frustration related indirectly to changes in mother-reported parenting over time through adolescent antisocial behavior. Model fit indices suggested relatively good fit of the model to the data (CFI = .934, RMSEA = .071, 90%CI = .065-.077).

The auto-regressive paths for parenting were all positive and significant, with psychological autonomy granting and limit setting showing the most stability over time. The auto-regressive effect of antisocial behavior was also high ( $\beta = .601, p < .001$ ). In terms of the covariate, age at time 1 was positively related to antisocial behavior at time 2 ( $\beta = .117, p < .001$ ).

As with the adolescent-reported parenting model, frustration did not directly predict any of the parenting dimensions at time 2 when controlling for time 1 parenting. However, as predicted, frustration at time 1 related to increases in antisocial behavior at time 2 ( $\beta = .111, p < .001$ ) controlling for the high stability of antisocial behavior. At time 2, antisocial behavior was negatively related to knowledge ( $\beta = -.472, p < .001$ ), tracking ( $\beta = -.175, p < .01$ ), and limit setting ( $\beta = -.114, p < .05$ ), so that mothers of more antisocial children tended to report having less knowledge, asking fewer questions of their adolescents, and giving later curfews to their children.

With respect to indirect effects, adolescent frustration at time 1 was negatively related to time 2 parental knowledge ( $\beta = -.052, p < .05$ ), limit setting ( $\beta = -.013, p < .05$ ), and tracking ( $\beta = -.019, p < .05$ ) through antisocial behavior at time 2. In other words, children rated as being more easily frustrated at time 1 engaged in more antisocial

behavior over time, and subsequently their mothers were less knowledgeable, less strict about curfew, and asked fewer questions.



**Figure 4.4.** Diagram of significant paths and squared correlations for alternate model based on mother-reported parenting

*Note.* Values indicate standardized beta weights. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . The covariate is indicated by a dashed rectangle, and was allowed to covary with the time 1 variables and time 2 error terms (double-headed arrows not pictured here). Error terms at time 2 were allowed to covary (double-headed arrow not pictured here).

**Table 4.5**

*Summary table of standardized beta coefficients, standard errors, and probability levels of direct effects for alternate models based on mother and adolescent reports of parenting*

Path	Mother			Adolescent		
	$\beta$	$SE$	$p$	$\beta$	$SE$	$p$
PAG1→PAG2	.776	.023	<.001	.639	.027	<.001
AI1→AI2	.563	.025	<.001	.608	.025	<.001
Know1→Know2	.426	.027	<.001	.441	.029	<.001
Track1→Track2	.256	.021	<.001	.477	.023	<.001
LS1→LS2	.695	.029	<.001	.739	.028	<.001
FRUS1→AB2	.111	.011	<.001	.107	.011	.001
AB1→AB2	.601	.034	<.001	.612	.035	<.001
AB2→PAG2	.010	.090	.824	.026	.146	.639
AB2→AI2	-.085	.076	.135	-.096	.130	.075
AB2→Know2	-.472	.120	<.001	-.353	.175	<.001
AB2→Track2	-.175	.116	.009	-.210	.240	<.001
AB2→LS2	-.114	.329	.023	.021	.386	.678
FRUS1→PAG2	.012	.019	.697	.006	.030	.861
FRUS1→AI2	-.044	.015	.224	-.044	.026	.200
FRUS1→Know2	-.026	.024	.478	.030	.033	.384
FRUS1→Track2	-.025	.024	.564	-.014	.049	.719
FRUS1→LS2	-.005	.064	.878	.017	.075	.590

*Note.* PAG = psychological autonomy granting, AI = acceptance-involvement, Know = knowledge, Track = tracking, LS = limit setting, FRUS = frustration, AB = antisocial behavior. 1 and 2 refer to the two times of measurement.

## **Discussion**

The aim of the current study was to examine whether the relation between authoritative parenting and antisocial behavior was indirect through an intermediate effect on adolescent frustration, and whether there was an indirect relation between frustration and parenting through adolescent antisocial behavior. Frustration in the current study is defined as one's anger or irritability upon the blocking or interrupting of goal-directed behaviors (Veenstra et al., 2006), and as an aspect of temperament, frustration proneness differs from state anger in that it is rooted in constitutionally-based individual differences with respect to negative affect (Rothbart & Derryberry, 1981).

To date, there has been little research concerning the longitudinal and indirect relations between parenting, the temperamental proneness to frustration (unmixed with fear and sadness), and antisocial behavior including overt and covert forms, in an adolescent sample. The current study makes a unique contribution to the literature by examining these indirect effects while involving several dimensions of parenting not typically assessed in relation to frustration, including psychological autonomy granting. In the current study, psychological autonomy granting is conceptualized as not merely being the inverse of psychological control, but also as involving the encouragement of adolescents to engage in self-expression and self-regulation.

### **Indirect Effects of Parenting on Antisocial Behavior through Frustration**

Results from the parent-led model, according to both mother and adolescent reports of parenting, provided support for the overarching hypothesis that three dimensions of parenting had indirect effects on antisocial behavior over time by affecting

an aspect of temperament, frustration, which was contemporaneously related to more involvement in antisocial behavior.

First, in support of the hypothesis that psychological autonomy granting would be indirectly linked with antisocial behavior through adolescent frustration, the indirect effect was significant and showed that psychological autonomy granting was negatively related to frustration over time as predicted, which was positively related to antisocial behavior. Thus, mothers who used non-coercive democratic discipline and involved the child's opinions in family decisions contributed to lower levels of frustration in the adolescent, which was related to less involvement in antisocial behavior like theft, vandalism, and violence. The current finding corresponds with previous research which found that a psychologically controlling parenting style related to experiences of frustration in 12- to 21-year-olds (Van Petegem et al., 2015), but differs notably in several ways. First, it suggests that a related yet distinct dimension of parenting, psychological autonomy granting (Kunz & Grych, 2013), is associated with decreases in temperamental frustration over time. Second, Van Petegem et al. (2015) used a measure of negative emotionality, whereas, with the measure of frustration used in the current study, an anger-driven link to antisocial behavior, unmixed with fear-based aggression, was investigated. And, third, while the study by Van Petegem et al. (2015) examined psychological control using a cross-sectional design, the current study was longitudinal in design and was thus able to show that less psychological autonomy granting contributed to greater adolescent frustration over time, above and beyond the stability effect of frustration and the effects of the other parenting dimensions.

This finding builds on self-determination theory (Soenens & Vansteenkiste, 2010), and has theoretical implications for parent management training, such that frustration-driven antisocial behavior may be reduced when parents show respect for, and encourage, their adolescent's autonomy. Conversely, the current finding implies that frustration-driven antisocial behavior may increase according to reactance theory when adolescents do not feel that their emotions, opinions, and decisions are respected, valued, and autonomous of parental coercion (Van Petegem et al., 2015). Previous researchers have discussed how, through psychological autonomy granting, parents use reasoning and explanation to help heighten their adolescent's sensitivity to consequences when the adolescent's choice is constrained (Barber, 1996), and how, through psychological autonomy granting, adolescents are given an opportunity to self-regulate and are encouraged to function independently or according to their own volition in problem-solving situations (Soenens & Vansteenkiste, 2010). Based on the current finding, parents are encouraged to act in such an autonomy-supportive fashion, while still maintaining age-appropriate limits, to help their children form and express their unique identities during the adolescent years.

Second, according to adolescent-reported parenting, the indirect effect of parental knowledge on antisocial behavior through adolescent frustration was significant and negative, so that more parental knowledge at time 1 was related to less frustration at time 2, which was related to less antisocial behavior at time 2. There is little previous research concerning the relation between parental knowledge and adolescent frustration to which the current finding may be compared. However, given that knowledge is most often gained in positive parent-child relationships through adolescent self-disclosure (Stattin &



Kerr, 2000), and because parental knowledge in the current study was a composite that included self-disclosure, it could be that adolescents who willingly provide their parents with personal information are less likely to be temperamentally prone to frustration. The current finding suggests that adolescents who willingly self-disclose more to their parents are less frustrated over time and are at the same time involved in less antisocial behavior.

Such an interpretation is in line with self-determination and reactance theory (Van Petegem et al., 2015). Theoretically, adolescents can perceive some monitoring behaviors of parents as intrusive and illegitimate (Keijsers & Laird, 2014), which could lead to more frustration and more antisocial behavior. But because greater parental knowledge may signify a stronger parent-child relationship, one founded on trust and open communication (Kerr, Stattin, & Trost, 1999), the current finding implies that there may be a lesser degree of conflict in the parent-adolescent relationship where adolescents disclose willingly. For these adolescents, their proneness to frustration may diminish as they have a trustworthy, loving caregiver with whom they feel safe to divulge important (and sometimes frustrating) details of their life. On the other hand, parents of adolescents who disclose less voluntarily may engage in more tracking, surveillance, and monitoring behaviors in attempts to increase their knowledge, which might lead to more frustration, and accordingly, relate to greater involvement in antisocial behavior over time.

Third, while the indirect effect of adolescent-reported acceptance-involvement on antisocial behavior through adolescent frustration was significant, contrary to hypotheses the effect was positive, so that more acceptance-involvement at time 1 was related to more frustration at time 2, and thus more involvement in antisocial behavior at time 2. If acceptance-involvement is the adolescents' perception of his or her mother as being

loving and responsive (Gray & Steinberg, 1999), then adolescent frustration theoretically should not increase in such a familial environment because relationships characterized by acceptance-involvement should involve fewer aversive experiences. For example, a responsive parent should not arbitrarily or unfairly block their child's goal-directed behavior. However, if the adolescent perceives his or her mother as being overly involved and unjustifiably so, adolescent frustration may increase. This interpretation is supported by previous research that suggests that some parenting behaviors are seen as intrusive, unless the adolescent perceives the parental involvement as legitimate and appropriate (Keijsers & Laird, 2014), and which has found a positive association between parents' emotional over-involvement and negative adolescent outcomes such as ADHD and oppositional behavior in childhood and adolescence (Moroney, Tung, Brammer, Peris, & Lee, 2017). However, because of the possibility of suppression effects which would explain the sign change from negative to positive between the zero-order and longitudinal correlations, this interpretation should be held lightly until future research can provide stronger support.

In summary, while this latter finding was not expected, these several findings do provide evidence to support the overarching hypothesis, whether there is a longitudinal, indirect effect between authoritative parenting and adolescent antisocial behavior through adolescent temperament, namely frustration. The findings are consistent with DeLisi and Vaughn's (2014) theory of a negative emotionality pathway to antisocial behavior, with Dollard et al.'s (1939) hypothesis that aggression follows frustration, with Berkowitz's (2012) adaptation of the frustration-aggression hypothesis that the more negative affect that is experienced, the greater the likelihood of aggression, and with Nigg's (2006)

proposal of a frustration pathway to conduct problems because of high surgency (i.e., excessive approach, or goal-directed behavior). They are also consistent with two other indirect effects found by Houltberg et al. (2016). In a study of 84 youth aged 7 to 15 years who were residing in disadvantaged neighborhoods, they found that parental support was positively associated with prosocial behavior through anger regulation, and that permissive discipline was positively associated with antisocial behavior through anger reactivity.

The current study differs from previous research which has largely studied frustration in relation to reactive aggression (e.g., Blair, 2004; 2010) and externalizing behaviors (e.g., Veenstra et al., 2006), as compared to the current outcome measure which involves both covert and proactive antisocial behavior. Not only that, but the current findings of indirect effects reveal a mechanism by which authoritative parenting relates to antisocial behavior which is not commonly mentioned in theories about parenting. While behavioral control measures are usually discussed as affecting antisocial behavior through social learning mechanisms (e.g., Patterson, 1982), and while psychological autonomy granting is usually discussed with reference to self-determination theory in relation to the child willingly adopting parental values to self-regulate (e.g., Soenens & Vansteenkiste, 2010), the current findings of indirect effects provide evidence that authoritative parenting may also operate by affecting emotional predispositions.

### **Indirect Effects of Frustration on Parenting through Antisocial Behavior**

There was evidence to support the hypotheses that adolescent frustration related indirectly to changes in different dimensions of parenting over time through adolescent

antisocial behavior. Significant indirect effects were found for frustration in relation to parental knowledge, tracking, and limit setting. In all of these indirect effects, frustration at time 1 significantly predicted increases in antisocial behavior at time 2 (above and beyond the effects of antisocial behavior at time 1), and, as predicted, antisocial behavior was negatively related to knowledge, tracking, and limit setting at time 2.

While there has recently been empirical evidence of the bidirectional relations between parenting and temperament with antisocial behavior (e.g., Lengua & Kovacs, 2005; Burke, Pardini, & Loeber, 2008), but because of the paucity of research regarding indirect relations between frustration and parenting through adolescent behavior, there are few findings to which the current results may be compared. However, in general, the indirect effect for parental knowledge builds on a study by Willoughby and Hamza (2011) in which they found that higher problem behavior including delinquency predicted lower parental knowledge over time. However, they are different in that the current study did not find a direct adolescent-parent effect for temperamental frustration, but rather an indirect adolescent-parent effect in which adolescent antisocial behavior was the intermediate variable between frustration and parental knowledge. Thus, the current study builds on temperament research about evocative effects by showing that evocative effects of temperament may be indirect, through their intermediate effect on antisocial behavior, rather than directly evoking less positive parenting.

Similarly, the findings of indirect effects of frustration on tracking and limit setting through antisocial behavior implies that parents of temperamentally frustrated, antisocial youth may ask fewer questions if their children have previously avoided, lied, or become defensive about answering, thereby decreasing their knowledge. Additionally,

parents of frustration-prone, antisocial youth may find it challenging to establish an appropriate curfew if their limits have been regularly disregarded or contested, and may eventually concede with their child's desire for a later curfew or none at all. Together, these findings correspond to the theory of coercive processes that occur in families, whereby parents remove requests and demands when children respond aversively, thereby negatively reinforcing undesired behaviors (Patterson, 1982). The current study suggests that, perhaps in these ways, some youth are more temperamentally predisposed to evocative effects via involvement in antisocial behavior that relates to less positive parenting.

### **Direct Effects of Parenting on Antisocial Behavior**

Results from the hypothesized model, according to both mother and adolescent report of parenting, indicated that parenting had direct effects on antisocial behavior over time as well. In addition to being indirectly related to antisocial behavior through frustration, parental knowledge at time 1 also had a significant direct path to antisocial behavior at time 2, above and beyond the effects of prior involvement in antisocial behavior and the effects of the other parenting dimensions. Greater maternal knowledge of adolescents' activities, friendships, and whereabouts related to adolescents' decreased involvement in antisocial behavior over time. This finding corresponds to other studies which found that monitoring knowledge is inversely related to problem behaviors like delinquency and substance abuse (e.g., Brown, Mounts, Lamborn, & Steinberg, 1993; Fletcher, Darling, & Steinberg, 1995; Loeber & Dishion, 1983; Loeber & Stouthamer-Loeber, 1987; Patterson & Dishion, 1985). This finding implies that parental knowledge, especially adolescents' perception of parental knowledge, helps decrease adolescent

involvement in antisocial behavior because the adolescent keeps their parent “in mind” while making decisions outside of their direct supervision. Also, parental knowledge regarding adolescents’ behaviors, activities, and friendships, gives parents the opportunity to have positive, trusting relationships with their children which diminishes antisocial behavior, but also to intervene or discipline if necessary before involvement with antisocial behavior progresses any further (Omer et al., 2016). Thus, the significant direct effect of knowledge, along with the indirect effect, indicates that knowledge may operate through more than one mechanism. Knowledge may affect temperamental frustration and hence antisocial behavior, but it may also operate by affecting parental discipline and through having positive, trusting relationships. Because knowledge is predicted most strongly by adolescent self-disclosure (Stattin & Kerr, 2000), parents of adolescents are encouraged to focus on establishing a mutually-respectful relationship with their child, based on open communication and trust, in which their child may feel safe to divulge pertinent information to a loving parent.

According to adolescent-reported parenting, limit setting at time 1 was also uniquely related to antisocial behavior at time 2, so that adolescents reported increased involvement in antisocial behavior over time when they were given a later curfew at time 1, and less involvement when they were given an earlier curfew at time 1. This finding builds on recent research which suggests that parental limit setting relates to less time spent in criminogenic settings in 12- to 19-year old adolescents (Janssen, Deković, & Bruinsma, 2014). Given that a large proportion of an adolescent’s free time is spent with peers in unsupervised settings engaging in unstructured activities (Larson, 2001), and that antisocial behaviors are more likely to occur in group settings (Warr, 2002), adolescents

who are given more free time in the evenings and on weekends to spend with friends via later curfew are albeit inadvertently given more opportunity to engage in antisocial behaviors. Thus, setting reasonable boundaries with adolescent children around curfew can be helpful in reducing adolescent involvement in antisocial behavior.

It is also valuable to note here that limit setting had a direct but not indirect effect on antisocial behavior. Unlike knowledge and psychological autonomy granting, which affected antisocial behavior through changes in temperamental frustration-proneness, limit setting did not involve this mechanism. Instead, previous research suggests that it may reduce time in criminogenic settings, and perhaps also exposure to deviancy training. Thus, the current findings illustrate the benefit of studying the various elements of authoritative parenting separately, given that they seem to be related to antisocial behavior over time in different ways.

### **Lack of Significant Direct Effects of Frustration on Parenting**

According to mother- and adolescent-reported parenting, adolescent frustration at time 1 did not significantly relate to changes in authoritative parenting at time 2 when controlling for the high stability of parenting over time. Adolescent frustration was expected to have a direct, negative effect on maternal parenting, so that mothers would show poorer parenting toward more easily frustrated adolescents. This hypothesis was consistent with previous theory and research about evocative gene-environment correlations (Rutter, Moffitt, & Caspi, 2006; Hill, 2002), and many studies reviewed by Kiff et al. (2011). Instead, there was no evidence of a direct effect of frustration on parenting over time. As discussed, however, temperament only had indirect effects on parenting, in that frustration at time 1 related to increases in antisocial behavior at time 2,

and antisocial behavior related concurrently to less parental knowledge and tracking (according to both informants), and less limit setting (according to mothers). This shows the importance of studying indirect effects of parenting, temperament, and antisocial behavior variables, as without using this approach to analysis, it would have appeared as though temperamental frustration had no bearing on parenting.

### **Practical Implications**

There are several implications for parenting and clinical practice that can be made based on an evaluation of the two current models. First, the current study found acceptance-involvement to be a double-edged sword. At time 1, the zero-order correlations between acceptance-involvement and antisocial behavior were negative according to both mother and adolescent reports of parenting. But longitudinally, there was a difference between parent and adolescent perspectives of acceptance-involvement, in that adolescent-reported (but not mother-reported) acceptance-involvement related to more adolescent frustration over time. It may be the case that the change in sign from negative to positive may be due to suppression effects of other variables in the model. For this reason, the current findings require further research and replication to increase confidence in possible interpretations. For example, the current finding may suggest that acceptance-involvement, while concurrently related to less antisocial behavior, may be perceived negatively by some adolescents over time. The challenge for parents thus becomes how can they be responsive and involved without being overly involved and intrusive?

Omer et al. (2016) recently proposed a model of vigilant care as a reformulation of parental monitoring. In their model, parents are encouraged to adopt a flexible attitude



in which they shift between open attention, focused attention, and protective steps dependent upon the degree of parental concern or alarm regarding their child's safety. The goal of this approach is to display a nonintrusive, caring interest in the child, and to establish an open interchange between parent and child, as well as those in the child's environment. At the level of open attention, the default level for parental involvement, parents initiate conversations and dialogues concerning themes of parental expectations about adolescent safety (e.g., computer use, driving, smoking). Parental involvement is expanded to focused attention if the child displays warning signs, such as lying, stealing, or problematic friendships or computer use. At this level, parents begin tracking and asking questions about the child's activities, and reassert previously established rules that are being ignored. If problematic behaviors recede, parental involvement returns to open attention, but if they persist, parents move to the level of active protection. At this level, parents take protective steps on their child's behalf, thus demonstrating to the child that they will not abdicate their responsibilities as a parent, even if the adolescent tries to create distance or concealment. In this approach, adolescents understand that the level of parental involvement is dependent upon their own behaviors, thus, different levels of involvement are justified and not viewed as arbitrary or illegitimate. This approach could also help parents continue to gain knowledge about the adolescent, which the current results indicate is important in reducing antisocial behavior. Further, this approach may help to maintain a good parent-child relationship, and keep the door open for adolescent self-disclosure, because the parent is mindful of not being too intrusive.

Second, parents should be made aware through education and training that there are common parenting challenges posed by the evocative indirect effects of frustration on

parenting through antisocial behavior. Parents of adolescents who are temperamentally prone to greater frustration and irritability should understand how this risk factor makes their child vulnerable to become involved in antisocial behavior, and consequently, how their child's involvement in antisocial behavior is likely to decrease their knowledge of their child through both less adolescent disclosure and less parental efforts to know, and to decrease the limits they place on their adolescent's time outside of the home. As in the monitoring approach of vigilant care (Omer et al., 2016), parents are encouraged to match their level of monitoring to the level of parental concern due to adolescent behavior. This involves asking questions, seeking to understand the world of their teenager, and showing patience while enforcing limits.

Third, because authoritative parenting may be a means to reduce frustration-driven antisocial behavior, improving frustration reactivity via authoritative parenting dimensions such as psychological autonomy granting may be a potential mechanism of parenting programs such as Parent Management Training (e.g., Kazdin, Siegel, & Bass, 1992) and *The Incredible Years* by Webster-Stratton (2011) beyond the social learning that occurs by using rewards and punishments to encourage more appropriate behavior. Thus, a further implication of the current study is that temperamental or emotional changes in the adolescent (e.g., decreased frustration), in addition to behavioral changes, could be measured when assessing the impact and effectiveness of these programs.

### **Theoretical Implications**

As mentioned, the current study examined the role of frustration in predicting antisocial behavior, the measure of which included overt (proactive) and covert types of antisocial behavior, when frustration has commonly been studied in relation to reactive

aggression, emotion dysregulation, defiance, and oppositionality. Thus, a key theoretical implication of the current findings, especially the indirect effects of psychological autonomy granting and knowledge on antisocial behavior through frustration, is that temperamental frustration and parent-evoked increases in frustration seem to play a role in a broader view of antisocial behavior, even when it is proactive (i.e., planned, goal-oriented) and covert in nature, rather than explicitly involving reactive aggression, emotional dysregulation, or oppositional defiance (as in externalizing behavior).

These findings may be consistent with Nigg's (2006) theory that frustration may lead to antisocial behavior by promoting excessive approach (that is, goal-directed or proactive) behavior toward desired antisocial (and potentially fun, or rewarding) activities, such as fighting, stealing and property destruction. In other words, rather than desisting from inappropriate behavior when blocked by parents, peers or other authority figures, adolescents who are high in temperamental frustration (and in some cases parent-evoked frustration) may persist in their engagement in this behavior, driven by anger and frustration, perhaps as a kind of defiance or rebellion.

### **Strengths and Limitations**

An important strength of the current study is that the analyses were methodologically conservative with respect to controlling for stability effects of mediators and outcome variables, and in so doing the effect sizes of the predictors in question are attenuated (Adachi & Willoughby, 2015). Nonetheless, there was still evidence supporting the longitudinal, direct effects of parenting on frustration and antisocial behavior, and of frustration on antisocial behavior.

While the self-report method for measuring delinquency and crime has been shown to be “acceptably valid and reliable for most research purposes” (Thornberry & Krohn, 2000), parent reports of antisocial behavior can be limited by a lack of parental knowledge of their adolescents’ behavior and activities outside the home. Barker, Bornstein, Putnick, Hendricks, and Suwalsky (2007) stated that the correlation between mother and adolescent report of behavior problems is low in magnitude, and that in community samples, adolescents tend to report more behavior problems than moms report of their child’s behavior. In other words, mother reports of adolescent antisocial behavior may be affected by impression management bias. Adolescent self-reported antisocial behavior, which was used in the current study, avoids potential biases introduced by mother report, due to impression management or lack of knowledge.

However, one limitation of the current study was that longitudinal relations were only considered within a two-wave design. In each model, we were able to account for the across-time effect of the predictor on the mediating variable, but only the within-time effect of the mediator on the outcome variable. It would have been better to have three waves of data for each of the variables, so that the longitudinal indirect effect of the predictor at time 1 on the outcome variable at time 3 through the mediator at time 2 could be studied.

An additional limitation is that there was a large proportion of missing data in this study which poses a methodological limitation. Several options for handling missing data were considered, but the expectation-maximization option available in SPSS was most suitable. Even though missing values analysis suggested that data were missing at random (i.e., there were not systematic differences between the participants who

completed questionnaires at both waves and those who discontinued in the study), it is possible that estimates and results were slightly biased. However, to examine the extent to which this may have been an issue, the same analyses were conducted using the data of those participants who completed questionnaires at both waves. The nature of relations between the variables and the effects of the path analyses were the same as those found for the whole sample ( $n = 521$ ), but some of the effects failed to reach significance. Because the sample size was smaller for those who participated at both waves ( $n = 254$ ), it is possible that lower statistical power to find significant effects contributed to the fewer significant findings.

### **Suggestions for Future Research**

As much as possible, future research should continue to use designs which account for initial levels of important study variables such as the potential mediator and outcome variables. Future research should also study other moderating relations between parenting, frustration, and antisocial behavior, such as the longitudinal interaction effects of parenting and temperament. For example, when parenting is less than ideal, low frustration should help reduce antisocial behavior, and conversely, for temperamentally at-risk children (e.g., when frustration is high), authoritative parenting should help reduce antisocial behavior.

Future research could explore whether frustration relates differently to the different factors of antisocial behavior. It may be that frustration relates more to the aggressive forms of antisocial behavior such as violence and vandalism (e.g., damaging someone else's property out of anger), rather than to the covert, less aggressive form of antisocial behavior, theft.

Also, while it was not a hypothesis of the current study, it is possible that effortful control moderates the relation between frustration and antisocial behavior. Indeed, Moran, Lengua, and Zaleswki (2013) found support of an interaction between frustration and effortful control in predicting externalizing symptoms in three-year-old children, in that high frustration related to more externalizing symptoms when effortful control was low. Additionally, Snyder et al. (2015) reported that low levels of effortful control and high levels of anger/frustration were related to problematic peer interactions, such as aggression or hitting (likely because of difficulty regulating negative emotions). Additionally, they found that effortful control was negatively correlated to frustration ( $r = -.23$ ). The current study only examined one aspect of temperament, however a broad view of parenting was considered. Thus, future research that examines interactions between effortful control and frustration would build on the findings of the current study.

### **Conclusions**

The current study explored the longitudinal relations between authoritative parenting, adolescent frustration, and adolescent antisocial behavior. The findings suggest a role for frustration in aspects of antisocial behavior that involve proactive aggression and covert antisocial acts, as opposed to it being related only to reactive aggression, emotional dysregulation, defiance, and oppositionality. Also, even though frustration and antisocial behavior showed high stability between the two times of measurement, there was still evidence to support that parenting related to antisocial behavior indirectly through adolescent frustration. Particularly the parenting dimensions pertaining to the mother-child relationship of psychological autonomy granting, acceptance-involvement, and knowledge seemed especially relevant to this model. These indirect effects with

frustration show a different mechanism for authoritative parenting, beyond social learning theories and self-determination theory. Moreover, even though antisocial behavior and parenting showed high stability over time, there was still support for the hypothesis that adolescent frustration related to changes in parenting (particularly those dimensions pertaining to behavioral control, namely knowledge, tracking, and limit-setting) through adolescent antisocial behavior. Collectively, the findings of these path analyses suggest the methodological importance of examining bidirectional relations between parenting and adolescent frustration and behavior using longitudinal data, and underscore the theoretical and foundational importance of including temperament in models of antisocial behavior (DeLisi & Vaughn, 2014).

## References

- Achenbach, T. M. (1991). *Manual for the Youth Self-Report and 1991 Profile*. Burlington, VT: University of Vermont Department of Psychiatry.
- Adachi P. & Willoughby, T. (2015). Interpreting effect sizes when controlling for stability effects in longitudinal autoregressive models: Implications for psychological science. *European Journal of Developmental Psychology*, 12, 116–128.
- Akers, R.L. (1973). *Deviant behavior: A social learning approach*. Belmont, CA: Wadsworth.
- Akers, R.L., Krohn, M.D., Lanza-Kaduce, L., & Radosevich, M. (1979). Social learning and deviant behavior: A specific test of a general theory. *American Sociological Review*, 44(4), 636-655.
- Barber, B.K. (1996). Parental psychological control: Revisiting a neglected construct. *Child Development*, 67: 3296–3319. doi:10.1111/j.1467-8624.1996.tb01915.x
- Barber, B.K., Olsen, J.E., & Shagle, S.C. (1994). Associations between parental psychological and behavioral control and youth internalized and externalized behaviors. *Child Development*, 65(4), 1120-1136.
- Barker, E.T., Bornstein, M.H., Putnick, D.L., Hendricks, C., & Suwalsky, J.T.D. (2007). Adolescent-mother agreement about adolescent problem behaviors: Direction and predictors of disagreement. *Journal of Youth and Adolescence*, 36(7), 950-962.
- Berkowitz, L. (1989). Frustration-aggression hypothesis: Examination and reformulation. *Psychological Bulletin*, 23, 70-84.
- Berkowitz, L. (1993). *Aggression: Its causes, consequences, and control*. New York: McGraw-Hill Book Company.
- Berkowitz, L. (2012). A different view of anger: The cognitive- neoassociation conception of the relation of anger to aggression. *Aggressive Behavior*, 38, 322-333.
- Blair, R.J.R. (2004). The roles of orbital frontal cortex in the modulation of antisocial behavior. *Brain and Cognition*, 55, 198-208.
- Blair, R.J.R. (2010). Psychopathy, frustration, and reactive aggression: the role of ventromedial prefrontal cortex. *British Journal of Psychology*, 101(3), 383-399.
- Blos, P. (1967). The second individuation process of adolescence. *Psychoanalytic Study of the Child*, 22, 162–186.



- Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation modeling perspective*. Hoboken, NJ: Wiley.
- Burke, J.D., Pardini, D.A., & Loeber, R. (2008). Reciprocal relationships between parenting behavior and disruptive psychopathology from childhood through adolescence. *Journal of Abnormal Child Psychology*, 36(5), 679–692.  
<http://doi.org/10.1007/s10802-008-9219-7>
- Capaldi, D.M., & Rothbart, M.K. (1992). Development and validation of an early adolescent temperament measure. *Journal of Early Adolescence*, 12(2), 153-173.
- Card, N.A., & Little, T.D. (2006). Proactive and reactive aggression in childhood and adolescence: A meta-analysis of differential relations with psychosocial adjustment. *International Journal of Behavioral Development*, 30(5), 466-480.
- Dane, A., McPhee, J., Root, L. & Derevensky, J. (2004). *Parental socialization of youth gambling*. Report to the Ontario Problem Gambling Research Centre, Guelph, Ontario.
- Delhay, M., Kempenaers, C., Burton, J., Linkowski, P., Stroobants, R., & Goossens, L. (2012). Attachment, parenting, and separation-individuation in adolescence: A comparison of hospitalized adolescents, institutionalized delinquents, and controls. *The Journal of Genetic Psychology*, 173(2), 119-141.
- DeLisi, M. & Vaughn, M.G. (2014). Foundation for a temperament-based theory of antisocial behavior and criminal justice system involvement. *Journal of Criminal Justice*, 42, 10-25.
- Dollard, J., Miller, N., Doob, L., Mowrer, O., & Sears, R. (1939). *Frustration and aggression*. New Haven, CT: Yale University.
- Dougherty, L.R., Smith, V.C., Bufferd, S.J., Kessel, E., Carlson, G.A., & Klein, D.N. (2015). Preschool irritability predicts child psychopathology, functional impairment, and service use at age nine. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 56(9), 999–1007.  
<http://doi.org/10.1111/jcpp.12403>
- Ford, J.D., Elhai, J.D., Connor, D.F., & Frueh, B.C. (2010). Poly-victimization and risk of posttraumatic, depressive, and substance use disorders and involvement in delinquency in a national sample of adolescents. *Journal of Adolescent Health*, 46, 545-552.
- Forgatch, M.S., Snyder, J.J., Patterson, G.P., Pauldine, M.R., Chaw, Y., Elish, K., Harris, J.B., & Richardson, E.B. (2016). Resurrecting the chimera: Progressions in parenting and peer processes. *Development and Psychopathology*, 28, 689-706.

- Gecas, V., & Seff, M.A. (1990). Families and adolescents: A review of the 1980s. *Journal of Marriage and the Family*, 52, 941-958.
- Gray, M.R., & Steinberg, L. (1999). Unpacking authoritative parenting: Reassessing a multidimensional construct. *Journal of Marriage and Family*, 61(3), 574-587.
- Hayes, L., Hudson, A., & Matthews, J. (2003). Parental monitoring: A process model of parent-adolescent interaction. *Behavior Change*, 20(1), 13-24.
- Hill, J. (2002). Biological, psychological, and social processes in the conduct disorders. *Journal of Child Psychology and Psychiatry*, 43(1), 133-164.
- Hoeve, M., Dubas, J.S., Eichelsheim, V.I., van der Laan, P.H., Smeenk, W., & Gerris, J.R.M. (2009). The relationship between parenting and delinquency: A meta-analysis. *Journal of Abnormal Child Psychology*, 37, 749-775.
- Hong, Y.R., & Park, J.S. (2012). Impact of attachment, temperament, and parenting on human development. *Korean Journal of Pediatrics*, 55(12), 449-454.
- Houlberg, B.J., Morris, A.S., Cui, L., Henry, C.S., & Criss, M.M. (2016). The role of youth anger in explaining links between parenting and early adolescent prosocial and antisocial behavior. *Journal of Early Adolescence*, 36(3), 297-318.
- Hu, L., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55.
- Hubbard, J.A., McAuliffe, M.D., Morrow, M.T., & Romano, L.J. (2010). Reactive and proactive aggression in childhood and adolescence: Precursors, outcomes, processes, experiences, and measurement. *Journal of Personality*, 78(1), 95-118.
- Janssen, H.J., Deković, M., & Bruinsma, G.J.N. (2014). Parenting and time adolescents spend in criminogenic settings: A between- and within-person analysis. *The British Journal of Criminology*, 54(4), 551-567.
- Kazdin, A.E., Siegel, T.C., & Bass, D. (1992). Cognitive problem-solving skills training and parent management training in the treatment of antisocial behavior in children. *Journal of Consulting and Clinical Psychology*, 60(5), 733-747.
- Keijsers L., & Laird R.D. (2014). Mother-adolescent monitoring dynamics and the legitimacy of parental authority. *Journal of Adolescence*, 37, 515-524.
- Kerr, M., & Stattin, H. (2000). What parents know, how they know it, and several forms of adolescent adjustment: Further support for a reinterpretation of monitoring. *Developmental Psychology*, 36(3), 366-380.

- Kerr, M., Stattin, H., & Trost, K. (1999). To know you is to trust you: Parents' trust is rooted in child disclosure of information. *Journal of Adolescence*, 22(6), 737-752.
- Kiff, C.J., Lengua, L.J., & Zalewski, M. (2011). Nature and nurturing: Parenting in the context of child temperament. *Clinical Child and Family Psychology Review*, 14(3), 251-301.
- Kunz, J.H., & Grych, J.H. (2013). Parental psychological control and autonomy granting: Distinctions and associations with child and family functioning. *Parenting: Science and Practice*, 13(2), 77-94.
- Larson, R.W. (2001). How U.S. children and adolescents spend time: What it does (and doesn't) tell us about their development. *Current Directions in Psychological Science*, 10(5), 160-164.
- Le Blanc, M., & Fréchette, M. (1989). *Male criminal activity from childhood through youth: Multilevel and developmental perspectives*. New York, NY: Springer-Verlag Publishing.
- Lengua, L.J. & Kovacs, E.A. (2005). Bidirectional associations between temperament and parenting and the prediction of adjustment problems in middle childhood. *Applied Developmental Psychology*, 26, 21-38.
- Luyckx, K., Tildesley, E.A., Soenens, B., Andrews, J.A., Hampson, S.E., Peterson, M., & Duriez, B. (2011). Parenting and trajectories of children's maladaptive behaviors: A 12-year prospective community study. *Journal of Clinical Child & Adolescent Psychology*, 40(3), 468-478.
- Moore, S., & Gullone, E. (1996). Predicting adolescent risk behavior using a personalized cost-benefit analysis. *Journal of Youth and Adolescence*, 25(3), 343-359.
- Moran, L.R., Lengua, L.J., & Zalewski, M. (2013). The interaction between negative emotionality and effortful control in early social-emotional development. *Social Development (Oxford, England)*, 22(2), 340-362.  
<http://doi.org/10.1111/sode.12025>
- Moroney, E., Tung, I., Brammer, W.A., Peris, T.S. and Lee, S.S. (2017). Externalizing outcomes of youth with and without ADHD: Time-varying prediction by parental ADHD and mediated effects. *Journal of Abnormal Child Psychology*, 45, 457-470. <https://doi.org/10.1007/s10802-016-0215-z>
- Morris, A., Silk, J., Steinberg, L., Sessa, F., Avenevoli, S., & Essex, M. (2002). Temperamental vulnerability and negative parenting as interacting predictors of child adjustment. *Journal of Marriage and Family*, 64(2), 461-471. Retrieved from <http://www.jstor.org/stable/3600118>

- Muhtadie, L., Zhou, Q., Eisenberg, N., & Wang, Y. (2013). Predicting internalizing problems in Chinese children: The unique and interactive effects of parenting and child temperament. *Development and Psychopathology*, 25, 653-667.
- Muris, P., Meesters, C., & Blijlevens, P. (2007). Self-reported reactive and regulative temperament in early adolescence: Relations to internalizing and externalizing problem behavior and “Big Three” personality factors. *Journal of Adolescence*, 30(6), 1035-1049.
- Murphy, T.P., Laible, D.J., Augustine, M., & Robeson, L. (2015). Attachment’s links with adolescents’ social emotions: The roles of negative emotionality and emotion regulation. *The Journal of Genetic Psychology*, 176(5), 315-329.
- Nigg, J.T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 47(3/4), 395-422.
- Odgers, C.L., Moffitt, T.E., Broadbent, J.M., Dickson, N., Hancox, R.J., Harrington, H., Poulton, R., Sears, M.R., Thomson, W.M., & Caspi, A. (2008). Female and male antisocial trajectories: From childhood origins to adult outcomes. *Development and Psychopathology*, 20, 673-716. doi: 10.1017/S0954579408000333
- Oldehinkel, A.J., Hartman, C.A., De Winter, A.F., Veenstra, R., & Ormel, J. (2004). Temperament profiles associated with internalizing and externalizing problems in preadolescence. *Development and Psychopathology*, 16, 421-440.
- Omer, H., Satran, S., & Driter, O. (2016). Vigilant care: An integrative reformulation regarding parental monitoring. *Psychological Review*, 123(3), 291-304.
- Patterson, G.R. (1982). *Coercive family process*. Eugene, OR: Castalia.
- Patterson, G.R., & Dishion, T. (1985). Contributions of families and peers to delinquency. *Criminology*, 23(1), 63-79.
- Paus, T. (2005). Mapping brain maturation and cognitive development during adolescence. *Trends in Cognitive Science*, 9(2), 60-68.
- Pinquart, M. (2017). Associations of parenting dimensions and styles with externalizing problems of children and adolescents: An updated meta-analysis. *Developmental Psychology*, 53(5), 873-932.
- Rhee, S.H., Friedman, N.P., Corley, R.P., Hewitt, J.K., Hink, L.K., Johnson, D.P., Smith Watts, A.K., Young, S.E., Robinson, J., Waldman, I.D., & Zahn-Waxler, C. (2016). An examination of the developmental propensity model of conduct problems. *Journal of Abnormal Psychology*, 125(4), 550-564.

- Rothbart, M.K., & Derryberry, D. (1981). Development of individual differences in temperament. In M.E. Lamb & A.L. Brown (Eds.), *Advances in developmental psychology*. Vol. 1. (pp. 37–86) Hillsdale, NJ: Erlbaum.
- Rothbart, M.K., & Rueda, M.R. (2005). The development of effortful control. In U. Mayr, E. Awh, & S. Keele (Eds.), *Developing individuality in the human brain: A tribute to Michael I. Posner* (pp. 167-188). Washington, D.C.: American Psychological Association.
- Rutter, M., Moffitt, T.E., & Caspi, A. (2006). Gene-environment interplay and psychopathology: Multiple varieties but real effects. *Journal of Child Psychology and Psychiatry*, 47(3-4), 226-261.
- Rydell, A.M., Berlin, L., & Bohlin, G. (2003). Emotionality, emotion regulation, and adaptation among 5- to 8-year-old children. *Emotion*, 3(1), 30–47.
- Segrin, C., Woszidlo, A., Givertz, M., Bauer, A., & Taylor Murphy, M. (2012). The association between overparenting, parent-child communication, and entitlement and adaptive traits in adult children. *Family Relations*, 61, 237–252.
- Sherman, L.J., Stupica, B., Dykas, M.J., Ramos-Marcuse, F., & Cassidy, J. (2013). The development of negative reactivity in irritable newborns as a function of attachment. *Infant Behavior and Development*, 36, 139-146.
- Snyder, H.R., Gulley, L.D., Bijttebier, P., Hartman, C.A., Oldehinkel, A.J., Mezulis, A., Young, J.F., & Hankin, B.L. (2015). Adolescent emotionality and effortful control: Core latent constructs and links to psychopathology and functioning. *Journal of Personality and Social Psychology*, 109(6), 1132-1149.
- Snyder, J., & Patterson, G. R. (1995). Individual differences in social aggression: A test of a reinforcement model of socialization in the natural environment. *Behavior Therapy*, 26, 371-391.
- Soenens, B., & Vansteenkiste, M. (2010). A theoretical upgrade of the concept of parental psychological control: Proposing new insights on the basis of self-determination theory. *Developmental Review*, 30, 74-99.
- Stattin, H. & Kerr, M. (2000). Parental monitoring: A reinterpretation. *Child Development*, 71(4), 1072-1085.
- Steinberg, L., Darling, N., & Fletcher, A. C. (1995). Authoritative parenting and adolescent adjustment: An ecological journey. In P. Moen, G. H. Elder, Jr., & K. Luscher (Eds.), *Examining lives in context: Perspectives on the ecology of human development* (pp. 423-466). Washington, DC: American Psychological Association.

- Thornberry, T.P., & Krohn, M.D. (2000). The self-report method for measuring delinquency and crime. *Measurement and analysis of crime and justice*, 4, 33-83.
- Tilton-Weaver, L. (2014). Adolescents' information management: Comparing ideas about why adolescents disclose to or keep secrets from their parents. *Journal of Youth and Adolescence*, 43(5), 803-813.
- Tremblay, R.E. (2010). Developmental origins of disruptive behavior problems: The 'original sin' hypothesis, epigenetics and their consequences for prevention. *Journal of Child Psychology and Psychiatry*, 51, 341-367. doi:10.1111/j.1469-7610.2010.02211.x
- VandenBos, G.R., & American Psychological Association. (2006). *APA dictionary of psychology* (1st ed.). Washington, DC: American Psychological Association.
- Van Petegem, S., Soenens, B., Vansteenkiste, M., & Beyers, W. (2015). Rebels with a cause? Adolescent defiance considered from the perspective of reactance theory and self-determination theory. *Child Development*, 86(3), 903-918.
- Veenstra, R., Lindenberg, S., Oldehinkel, A.J., De Winter, A.F., & Ormel, J. (2006). Temperament, environment, and antisocial behavior in a population sample of preadolescent boys and girls. *International Journal of Behavioral Development*, 30(5), 422-432.
- Vitaro, F., Brendgren, M., & Barker, E.D. (2006). Subtypes of aggressive behaviors: A developmental perspective. *International Journal of Behavioral Development*, 30(1), 12-19.
- Warr, M. (2002). *Companions in crime: The social aspects of criminal conduct*. New York: Cambridge University Press.
- Webster-Stratton, C. (2011). *The Incredible Years: Parents, teachers, and children's training series*. Seattle, Washington: Incredible Years, Inc.
- Willoughby, T. & Hamza, C. (2011). A longitudinal examination of the bidirectional associations among perceived parenting behaviors, adolescent disclosure and problem behavior across the high school years. *Journal of Youth and Adolescence*, 40(4), 463-478.
- Zhou, Q., Main, A., & Wang, Y. (2008). The relations of temperamental effortful control and anger/frustration to Chinese children's academic achievement and social adjustment: A longitudinal study. *Journal of Educational Psychology*, 102(1), 180-196.

## CHAPTER 5

### General Discussion

An extensive literature demonstrates a link between parenting and conduct problems in adolescence (e.g., Burt, Barnes, McGue, & Iacono, 2008; Farrington, 2000; Keijsers, Frijns, Branje, & Meeus, 2009; Kerr, Stattin, & Trost, 1999; Stattin & Kerr, 2000; Steinberg, Darling, & Fletcher, 1995; Van Doorn, Branje, & Meeus, 2008). There is also a growing body of research that shows a link between having a difficult temperament, including lower executive cognitive function (e.g., Sorge, Skilling, & Toplak, 2015), and aggressive and non-aggressive forms of antisocial behavior, providing the foundation for a temperament-based theory of antisocial behavior (DeLisi & Vaughn, 2014). More recently, researchers have begun examining models in which children's temperament traits have evocative influences on parenting (e.g., Lee et al., 2013; Lengua & Kovacs, 2005).

The main purpose of the current dissertation was to assess whether the well-established relation between parenting and antisocial behavior may also involve an indirect effect through adolescent temperament, and whether adolescent temperament had reciprocal effects on parenting directly and indirectly through antisocial behavior. Across the three studies, possible indirect relations between five factors of authoritative parenting (psychological autonomy granting, acceptance-involvement, knowledge, tracking, and limit setting), three aspects of temperament (effortful control in Study 1, affiliation in Study 2, and frustration in Study 3), and antisocial behavior in a sample of male and female adolescents were examined using a half-longitudinal design. While each study focused on a different aspect of temperament, they all tested two models: the first

model examined possible indirect effects of parenting on future antisocial behavior through adolescent temperament, and the second model examined possible indirect effects of temperament on future parenting through antisocial behavior. Data were collected from a community sample of mothers and their adolescent children who responded to questionnaires containing measures of maternal parenting and adolescent temperament, and self-reported antisocial behavior.

Together, the three studies provide support for the following: parenting relates to changes over time in antisocial behavior directly and indirectly through adolescent temperament; and adolescent temperament relates to changes over time in parenting directly and indirectly through antisocial behavior. The patterns of these results are summarized in Tables 5.1 and 5.2 and discussed in the following section with the aim of integrating the three studies into appropriate theoretical and empirical contexts.



Table 5.1

*Summary of direct and indirect effects in each study: Main model*

<b>Study 1</b>	<b>Study 2</b>	<b>Study 3</b>
<u><i>T1 Parenting to T2 Antisocial Behavior</i></u>		
PAG → AB (ns)	PAG → AB (ns)	PAG → AB (ns)
AI → AB (positive)	AI → AB (ns)	AI → AB (ns)
Knowledge → AB (negative)	Knowledge → AB (negative)	Knowledge → AB (negative)
Tracking → AB (ns)	Tracking → AB (ns)	Tracking → AB (ns)
LS → AB (negative)	LS → AB (negative)	LS → AB (negative)
<u><i>T1 Parenting to T2 Temperament</i></u>		
PAG → EC (negative)	PAG → AFF (negative)	PAG → FRUS (negative)
AI → EC (positive)	AI → AFF (positive)	AI → FRUS (positive)
Knowledge → EC (positive)	Knowledge → AFF (ns)	Knowledge → FRUS (negative)
Tracking → EC (negative)	Tracking → AFF (ns)	Tracking → FRUS (ns)
LS → EC (ns)	LS → AFF (negative)	LS → FRUS (ns)
<u><i>T2 Temperament to T2 Antisocial Behavior</i></u>		
EC → AB (negative)	AFF → AB (positive)	FRUS → AB (positive)
<u><i>T1 Parenting to T2 Temperament to T2 Antisocial Behavior</i></u>		
PAG → EC → AB (positive)	PAG → AFF → AB (negative)	PAG → FRUS → AB (negative)
AI → EC → AB (negative)	AI → AFF → AB (positive)	AI → FRUS → AB (positive)
Knowledge → EC → AB (negative)	Knowledge → AFF → AB (negative)	Knowledge → FRUS → AB (negative)
Tracking → EC → AB (positive)	Tracking → AFF → AB (ns)	Tracking → FRUS → AB (ns)
LS → EC → AB (ns)	LS → AFF → AB (negative)	LS → FRUS → AB (ns)

*Note.* T1 = time 1; T2 = time 2; PAG = psychological autonomy granting; AI = acceptance-involvement; LS = limit setting; EC = effortful control; AFF = affiliation; FRUS = frustration; ns = non-significant.

Table 5.2

*Summary of direct and indirect effects in each study: Alternate model*

<b>Study 1</b>	<b>Study 2</b>	<b>Study 3</b>
<u><i>T1 Temperament to T2 Parenting</i></u>		
EC → PAG (positive)	AFF → PAG (positive)	FRUS → PAG (ns)
EC → AI (ns)	AFF → AI (positive)	FRUS → AI (ns)
EC → Knowledge (positive)	AFF → Knowledge (positive)	FRUS → Knowledge (ns)
EC → Tracking (positive)	AFF → Tracking (positive)	FRUS → Tracking (ns)
EC → LS (negative)	AFF → LS (ns)	FRUS → LS (ns)
<u><i>T1 Temperament to T2 Antisocial Behavior</i></u>		
EC → AB (negative)	AFF → AB (positive)	FRUS → AB (positive)
<u><i>T2 Antisocial Behavior to T2 Parenting</i></u>		
AB → PAG (ns)	AB → PAG (ns)	AB → PAG (ns)
AB → AI (ns)	AB → AI (ns)	AB → AI (ns)
AB → Knowledge (negative)	AB → Knowledge (negative)	AB → Knowledge (negative)
AB → Tracking (negative)	AB → Tracking (negative)	AB → Tracking (negative)
AB → LS (negative)	AB → LS (negative)	AB → LS (negative)
<u><i>T1 Temperament to T2 Antisocial Behavior to T2 Parenting</i></u>		
EC → AB → PAG (ns)	AFF → AB → PAG (ns)	FRUS → AB → PAG (ns)
EC → AB → AI (ns)	AFF → AB → AI (negative)	FRUS → AB → AI (ns)
EC → AB → Knowledge (positive)	AFF → AB → Knowledge (negative)	FRUS → AB → Knowledge (negative)
EC → AB → Tracking (positive)	AFF → AB → Tracking (negative)	FRUS → AB → Tracking (negative)
EC → AB → LS (positive)	AFF → AB → LS (negative)	FRUS → AB → LS (negative)

*Note.* T1 = time 1; T2 = time 2; PAG = psychological autonomy granting; AI = acceptance-involvement; LS = limit setting; EC = effortful control; AFF = affiliation; FRUS = frustration; ns = non-significant.

### **Indirect Effects of Parenting on Antisocial Behavior through Temperament**

In support of the overarching hypotheses of the current dissertation, and consistent with various temperament theories of antisocial behavior (e.g., DeLisi & Vaughn, 2014; Nigg, 2006), there were indirect effects of authoritative parenting on antisocial behavior through all three temperament traits, as well as direct effects of all three temperament traits on antisocial behavior (see Table 5.1). Based on the results from the hypothesized model, the following hypotheses were most strongly supported, due to findings that are consistent with predictions, previous theory and research, and replicated across models using adolescent and maternal ratings of parenting, or across models using all three temperament variables. First, the indirect negative effect of acceptance-involvement on antisocial behavior through improved effortful control was consistent with hypotheses, and similar between mother and adolescent report. Second, the indirect negative effect of psychological autonomy granting on antisocial behavior through reduced frustration was consistent with hypotheses, and similar between mother and adolescent report. And third, there were indirect negative effects of knowledge on antisocial behavior through all three temperament traits in accordance with hypotheses.

Across the three studies, psychological autonomy granting, acceptance-involvement, and parental knowledge were the authoritative parenting dimensions which most consistently had a significant indirect effect on antisocial behavior through adolescent temperament. Moreover, of the three aspects of authoritative parenting that were consistently linked with antisocial behavior through temperament, only knowledge was consistently associated in the expected way, and in a way that could always be construed as beneficial (although the direct effect of knowledge on affiliation was only

marginally significant). In contrast, although psychological autonomy granting and acceptance-involvement also had indirect effects on antisocial behavior through all three temperament variables, the direction of the effects varied. For instance, psychological autonomy granting was positively related to antisocial behavior through effortful control, but negatively related to antisocial behavior through affiliation and frustration.

Acceptance-involvement was negatively related to antisocial behavior through effortful control, but positively related to antisocial behavior through frustration and affiliation.

With respect to the more behavioral control aspects of parenting, limit setting and tracking, there was less consistent evidence that they were indirectly related to antisocial behavior through changes to adolescent temperament. Limit setting was directly and negatively related to antisocial behavior in all three studies, but it was also involved in one negative indirect effect on antisocial behavior through (lowering) affiliation. Instead of relating to antisocial behavior primarily through temperament then, it may be more likely to involve other mechanisms, like limiting adolescent exposure to criminogenic settings (Janssen, Deković, & Bruinsma, 2014), or to unsupervised involvement with peers (Larson, 2011) and deviancy training (Dishion, Spracklen, Andrews, & Patterson, 1996). On the other hand, there were no direct effects of tracking on antisocial behavior, nor any indirect effects besides the positive one based on adolescent-reported parenting and effortful control, so this may be the least essential aspect of authoritative parenting in relation to antisocial behavior, especially given previous research showing adverse effects. In general, the decision to examine various facets of authoritative parenting separately is justified by these substantial variations in results pertaining to the indirect effects examined.

However, of the findings that were consistent using adolescent and mother ratings of parenting, the positive indirect effect of psychological autonomy granting on antisocial behavior through reduced effortful control was contrary to hypotheses. As well, the negative indirect effect of limit setting on antisocial behavior through reduced affiliation was contrary to hypotheses in that authoritative parenting dimensions were expected to improve affiliation and affiliation was expected to lead to less antisocial behavior over time. Also, the finding that adolescent-reported acceptance-involvement was positively indirectly related to antisocial behavior through increased frustration was contrary to hypotheses. More caution is needed in interpreting these, and they call for future research to better understand the possibly adverse effects of psychological autonomy granting (lowering effortful control over time), acceptance-involvement (increasing frustration over time), and limit setting (lowering affiliation over time). Relatedly, future research is needed to better understand affiliation, including why psychological autonomy granting, knowledge, and limit setting seem to decrease it over time, and why affiliation has a direct, positive relation with antisocial behavior over time.

Nonetheless, taken together, the current findings build on empirical evidence of indirect effects of parenting on antisocial behavior through adolescent temperament, for example, that permissive discipline relates to antisocial behavior indirectly through youths' anger reactivity (Houlberg, Morris, Cui, Henry, & Criss, 2016). They add an important contribution to the literature, however, by examining a five-factor model of authoritative parenting and three aspects of temperament.

In summary, there are several possible processes or mechanisms that might be in play to explain the three aspects of authoritative parenting that were most consistently

indirectly related to antisocial behavior through temperament. To start, higher levels of parental knowledge can provide parents with the information needed to help guide adolescent decision making and externally regulate some of the adolescent's behaviors. Because parental knowledge is often gained through adolescent disclosure which is predicted by adolescent trust, higher levels of parental knowledge can also signify a stronger *parent-adolescent relationship* founded on trust (Kerr, Stattin, & Trost, 1999). Under such circumstances, adolescents are more likely to have positive adjustment outcomes such as self-regulation (Kerr & Stattin, 2000), and adolescents should theoretically have fewer frustrating, conflictual interactions with their parents. These implications were seen in the current findings that knowledge was related to increases in effortful control and decreases in frustration, and consequently less antisocial behavior. Acceptance-involvement likely functions via having a *strong attachment relationship* with parents which aids in the process of instilling trust in others and enhancing the adolescent's valuation of relationships (Skinner & Zimmer-Gembeck, 2007).

In trusting parents, adolescents are more likely to want to imitate their parents and are more likely to internalize parental values (Kochanska, 2002; Kochanska & Kim, 2014), while in trusting others (including parents), adolescents are more likely to seek support to help them self-regulate. These theoretical implications were suggested by the finding that acceptance-involvement was related to less antisocial behavior through improvements in effortful control. However, even though acceptance-involvement could lead one to value relationships more highly via secure attachment processes, affiliative adolescents are more likely to spend time in social settings with peers, where they may be more likely to engage in antisocial behavior (Warr, 2002). Based on the current findings

that affiliation was positively related to antisocial behavior, affiliation may be a risk factor rather than a protective factor. Finally, psychological autonomy granting did not appear to improve effortful control or affiliation as theorized, by giving the adolescent chances to self-regulate, for example, which would have signified an *opportunity to practice* mechanism. Instead, psychological autonomy granting helped decrease frustration, perhaps by allowing the adolescent to engage in autonomy and identity goals which are prominent during adolescence without being unduly infringed upon by parents. On the other hand, psychological control is likely to increase negative affect by invalidating feelings and withholding affection (Morris et al., 2002), which may contribute to externalizing problems. These findings signify the importance of self-determination principles, fleshed out in *autonomy-supportive parenting*, in minimizing reactance frustration (Soenens & Vansteenkiste, 2010; Van Petegem et al., 2015).

**Direct effects of parenting on temperament.** Subsumed within the indirect effects of parenting on antisocial behavior are various direct effects, including how parenting related directly to temperament. Findings of the current studies build on previous research which suggests that parenting shapes child temperament by finding evidence for such a link in an adolescent sample. These findings are particularly significant in light of the fact that the current analyses statistically controlled for time 1 temperament. In other words, despite the high stability of effortful control (approximately .86), affiliation (approximately .73), and frustration (approximately .67) between the two times of measurement, there was evidence that each of the parenting dimensions related to changes in at least one of the aspects of temperament measured at time 2. This fits with the conceptualization of temperament as being a biologically-based system that may

change and develop over time through adolescent interactions with his or her environment (Rothbart & Bates, 2006). However, the over-time relations were not all in the expected direction.

Across all three studies, psychological autonomy granting was significantly related to changes in temperament over time, negatively predicting effortful control, affiliation, and frustration, with generally consistent results between mother and adolescent reports. While the finding that psychological autonomy granting predicted less frustration over time was expected, it was not expected that it would predict less effortful control or less affiliation. Apart from the possibility of suppression (Tu, Gunnell, & Gilthorpe, 2008), the negative relation with effortful control may be due to the ways that parents socialize emotion (e.g., Silkenbeumer, Schiller, Holodyski, & Kartner, 2016) if and when psychological autonomy granting reflects a permissiveness surrounding the development of adolescent self-regulation and effortful control (Wei & Kendall, 2014). In other words, if parents employ a “hands off” approach when it comes to their adolescents’ emotions, they may miss opportunities to help their adolescent properly understand their own emotional reactivity, to think about the longer-term consequences of acting out on their emotions, and to consider the impact their behavior has on others. This interpretation is also consistent with the finding that psychological autonomy granting was negatively related to affiliation over time. A possible explanation for the inverse relation between psychological autonomy granting and affiliation is that with greater autonomy granting comes more opportunities for independence, and thus the adolescent is perceived to be less affiliative.



Further, across all three studies, acceptance-involvement significantly related to changes in adolescent temperament over time, positively predicting effortful control, affiliation, and frustration with some apparent differences between mother and adolescent-reported parenting. The finding that acceptance-involvement related to more effortful control over time provides support for this association in an adolescent sample, extending previous research which has found a positive correlation between both maternal acceptance and maternal involvement with self-regulation abilities in children (Lengua & Kovacs, 2005). The findings that acceptance-involvement related to more effortful control and affiliation align with previous research concerning adolescent personality traits, insofar as effortful control is related to conscientiousness and affiliation is related to agreeableness. Specifically, Schofield et al. (2008) found that positive parenting, which they operationalized as high levels of observed warmth and support and low levels of hostility and coercion, observed at 8<sup>th</sup> and 10<sup>th</sup> grade, predicted higher levels of adolescent agreeableness and conscientiousness 2 years later, in 10<sup>th</sup> and 12<sup>th</sup> grade respectively. Acceptance-involvement was expected to lead to increases in self-regulation and affiliation because, in the context of a warm and caring parent-adolescent relationship, adolescents are more likely to internalize parental values, seek external support to help them regulate difficult emotions, and desire emotional closeness with others because of having a secure attachment relationship. As mentioned, the current findings support these theoretical implications.

The finding that adolescent-reported acceptance-involvement related to increases in adolescent frustration was contrary to hypotheses. It suggests that adolescents who rate their mothers as being highly involved during their teenage years become more frustrated

about the blocking of their goals over time. Adolescents who perceive their mothers as being high in involvement may feel that their goals regarding autonomy and independence are not being respected, as adolescence is a time of separation-individuation from parents (Blos, 1967; Delhay et al., 2012). For this interpretation to be feasible, one would expect that parental involvement would not be related to frustration in childhood. Indeed, in a sample of 8- to 11-year-old children, Lengua and Kovacs (2005) found that neither maternal acceptance nor involvement predicted child irritability.

The findings for parental knowledge differed depending on the temperament trait in question. In study 1, there was evidence based on mother report that parental knowledge positively predicts adolescent effortful control over time. Because the reciprocal relation in the alternative model from effortful control to adolescent-reported parental knowledge was positive, which supports the finding that youth with better effortful control give more information to their parents, the current finding suggests that parental knowledge helps improve adolescent effortful control as effortful control improves parental knowledge. The more mothers know about their adolescent (whether through solicitation or self-disclosure), the better able they are to help their child make decisions, including how to inhibit impulses and activate certain behaviors by thinking through the longer-term consequences. This form of co-regulation develops into, and helps improve, self-regulation (Silkenbeumer et al., 2016). In study 2, I did not find support for the over-time relation between parental knowledge and adolescent affiliation. In study 3, there was evidence that adolescent-reported parental knowledge was negatively related to adolescent frustration over time, which (because this measure

included self-disclosure) might indicate that adolescents who disclose more to their parents decrease in their proneness to frustration and irritability. More generally, high levels of parental knowledge and adolescent self-disclosure suggest a positive parent-child relationship (e.g., Kerr & Stattin, 2000), which may mean less parent-child conflict (which can be caused by over-solicitous, overprotective parenting; Segrin, Wosidlo, Givertz, Bauer, & Murphy, 2012), and therefore less frustration. This finding suggests that rather than increase frustration, parents can have a high level of knowledge and actually reduce adolescent frustration, when adolescent self-disclosure is one of the ways this knowledge is obtained.

Tracking did not relate to changes in affiliation or frustration over time, however it was negatively related to effortful control over time according to adolescent-reported parenting. This suggests that adolescents who perceived their mothers as trying to know more about their friendships, activities, and whereabouts showed significant decreases in effortful control over time. This finding relates to previous research and theory which suggests that high maternal tracking is perceived by some adolescents as intrusive or distrusting (Kerr & Stattin, 2000), and that effortful control abilities are hampered over time in such a relationship. Moreover, adolescents who are already high in effortful control may be more sensitive to parental attempts to track or more likely to perceive high tracking as intrusive given their sense of self as competent and trustworthy. Indeed, Rothbart, Ahadi, and Hershey (1994) showed that high effortful control tends to be found in children with high empathy, and Crocetti et al. (2016) found that adolescent empathy moderated the relation between parental solicitation and antisocial behaviors, so that solicitation was related to more antisocial behavior when adolescents were higher in

empathy. Their finding implies that tracking may have aversive effects when directed at adolescents with good social competence and self-regulation abilities, and with respect to the current finding, that may be one reason why tracking could inhibit development of effortful control. Another possible reason is that tracking is a form of external behavioral control by parents. Too much of this may limit opportunities for adolescent self-regulation, and therefore reduce growth in effortful control.

Limit setting did not relate to changes in effortful control or frustration over time, however it was negatively related to affiliation over time according to mother- and adolescent-reported parenting. Together, the findings that adolescents who were given stricter curfews were rated as being less affiliative over time, and that adolescents who were higher in affiliation showed more antisocial behavior, suggests that adolescents who are required to be home earlier spend less time outside of the home with peers and thus have less opportunity to develop relationships with peers who may engage in antisocial behaviors. Thus, the possibility of exposure to deviancy training is reduced, as youth who are high in antisocial behavior tend to associate with similar friends who model and reinforce antisocial behavior (Dishion et al., 1996; Poulin & Boivin, 2000). The findings also suggest that the effects of affiliation may depend on the other characteristics of the individual, and the characteristics of friends and associates, especially the level of antisocial behavior. Individuals who are high in antisocial behavior, who desire close relationships with others because of a highly affiliative temperament, are likely to choose friends who are also high in antisocial behavior, and therefore be subject to deviancy training (Dishion et al., 1996; Poulin & Boivin, 2000). In any case, it calls into question the relation between a temperamental predisposition to affiliation (i.e., desiring warm,

close relationships) and actual affiliation with peers. The two aspects of affiliation, social and temperamental, may be mutually reinforcing such that being high in one may increase the likelihood of being high in the other and vice versa.

In summary, this group of findings highlights the importance of analyzing the effects of parenting on temperament with parenting partitioned into separate factors based on factor analyses. Of the various authoritative parenting dimensions, psychological autonomy granting was consistently negatively related to temperament, and acceptance-involvement was consistently positively related to temperament. Knowledge was found to be positively related to effortful control and negatively related to frustration, tracking was found to be negatively related to effortful control, and limit setting was found to be negatively related to affiliation. Together, these findings indicate new empirical and theoretical contributions to the literature, because previously, with respect to effortful control, studies have largely involved children to the exclusion of adolescents, with respect to affiliation, theories have typically assumed positive relations between parenting and affiliation, and with respect to frustration, studies have typically focused on autonomy-related aspects of parenting to the exclusion of relational components (e.g., acceptance-involvement and knowledge).

**Direct effects of parenting on antisocial behavior.** Analyses of the first model also yielded results which generally align with previous research that shows a contemporaneous link between authoritative parenting and problem behaviors in adolescence (e.g., Steinberg, Darling, & Fletcher, 1995) and a longitudinal link between authoritative parenting and antisocial behavior in children (e.g., Luyckx et al., 2011). However, by simultaneously estimating the effects of a five-factor model of authoritative

parenting, controlling for time 1 antisocial behavior, significant effects in the current dissertation reflect unique contributions to the variance in antisocial behavior above and beyond the effects of the other parenting dimensions.

In the current dissertation, the monitoring knowledge variable was partitioned to examine the unique effects of parental knowledge, tracking (i.e., trying to know), and limit setting on antisocial behavior. Additionally, given research indicating that parental knowledge is primarily explained by adolescent self-disclosure (Kerr & Stattin, 2000; Stattin & Kerr, 2000), the adolescent-reported parenting measure of knowledge included a measure of adolescent self-disclosure. The three studies provided consistent evidence that both parental knowledge and limit setting were negatively related to antisocial behavior over time, generally according to both mother and adolescent report, while controlling for the effects of the other parenting factors, temperament, age, and initial levels of antisocial behavior. In line with a recent study of 10- to 12-year-old twins in which parental monitoring did not predict less antisocial behavior later (Wertz et al., 2016), the current study did not find evidence that time 1 tracking (i.e., trying to know) predicted time 2 antisocial behavior over time, when controlling for the other parenting factors, the stability of antisocial behavior, and the effects of temperament and age. These findings build on previous research which suggests that monitoring knowledge is inversely related with problem behaviors like substance abuse and delinquency (e.g., Brown, Mounts, Lamborn, & Steinberg, 1993; Fletcher, Darling, & Steinberg, 1995; Loeber & Dishion, 1983; Loeber & Stouthamer-Loeber, 1987; Patterson & Dishion, 1985), and specify that knowledge, not tracking, is the aspect of monitoring that is largely responsible for the association with antisocial behavior (e.g., Kerr, Stattin, & Özdemir,

2012). Additionally, the current research suggests that its contribution is independent of different aspects of temperament.

Because limit setting was operationalized in the current dissertation as weekday and weekend curfew (Gray & Steinberg, 1999), the implications of the findings differ from research which operationalizes limit setting as not only setting clear rules but also providing consequences for misbehavior (e.g., Janssen, Weerman, & Eichelsheim, 2017). Instead, the finding in the current studies that more limit setting (i.e., earlier curfews) related to less antisocial behavior over time is consistent with some previous research concerning curfews, although much of the research concerning curfews involves juvenile curfew laws for public spaces rather than parent-imposed curfews enforced within the home (Adams, 2003). However, even the research regarding juvenile curfew laws is reported by Grossman and Miller (2015), in a systematic review, to be limited in number, and of mixed quality. For example, curfew was found to have a negative effect on the arrest rates of young adults, but not to reduce the level of self-reported criminal activity (Gius, 2011). The findings of the current dissertation imply that this specific expression of behavioral control does indeed have negative direct effects on antisocial behavior. It may be that having an earlier curfew limits the amount of time that adolescents may spend in unsupervised settings with peers which may limit their exposure to deviancy training (Dishion et al., 1996), an interpretation which is supported by recent research suggesting that parental limit setting relates to less time spent in criminogenic settings in 12- to 19-year old adolescents (Janssen, Deković, & Bruinsma, 2014).

Across the three studies, acceptance-involvement was not generally found to be related to antisocial behavior over time after accounting for the effects of temperament,

age, the other parenting factors, and previous antisocial behavior, with one exception. These non-significant effects were contrary to previous research which has found a negative relation between parental support and delinquency (Barnes & Farrell, 1992) and my hypothesis that parental warmth and responsiveness should lead to a reduction in antisocial behavior. A possible reason why acceptance-involvement was not found to be related to antisocial behavior in each of the three studies is that acceptance-involvement is not as strongly related to delinquency as extremely negative parenting behaviors relevant to this same dimension such as rejection, neglect, and hostility (Hoeve et al., 2009) which the current measure did not involve (Gray & Steinberg, 1999). Hoeve et al. (2009) found that it is the negative aspects of support (such as rejection, neglect, and hostility) that were related to delinquency, and they argue that the support dimension of parenting is not a continuum with one side referring to positive aspects and the other side referring to their absence, but rather that the positive and negative aspects of support are distinct and separate parenting dimensions. As mentioned, however, there was some evidence based on mother-reported parenting in Study 1 to suggest that acceptance-involvement may be positively related to antisocial behavior over time. This finding aligns with research that has found a positive association between parents' emotional over-involvement and negative adolescent outcomes such as ADHD and oppositional behavior in childhood and adolescence (Moroney, Tung, Brammer, Peris, & Lee, 2017). However, because this effect was only significant in one of six path models, it should be interpreted with caution as it may be due to suppression (Tu et al., 2008). Also, whereas there was only one significant direct effect of acceptance-involvement on antisocial behavior, there was an important and consistent finding across the three studies that



acceptance-involvement was indirectly related to antisocial behavior through temperament. This exemplifies the benefit of studying indirect effects of parenting on antisocial behavior through temperament, as without this additional information, the relation of acceptance-involvement with antisocial behavior would be underestimated and misunderstood.

Across all three studies, neither psychological autonomy granting nor tracking directly predicted changes in antisocial behavior. This aligns with previous research which has not found a significant relation between psychological autonomy granting and behavior problems in 14- to 18-year-olds (Gray & Steinberg, 1999) and research which suggests that psychological autonomy granting is associated with internalizing symptoms rather than externalizing behaviors (Barber, Olsen, & Shagle, 1994).

### **Indirect Effects of Temperament on Parenting through Antisocial Behavior**

Consistent with the concept of evocative gene-environment correlations (Rutter, 2006), and in support of the hypotheses that adolescent temperament and antisocial behavior predicted parenting, analyses of a second model found that there were significant direct and indirect effects between adolescent temperament and authoritative parenting through antisocial behavior (see Table 5.2). As mentioned, this model was used to examine whether adolescent temperament and antisocial behavior predicted parenting, in a similar manner to how parenting predicted temperament and antisocial behavior in the hypothesized model. Psychological autonomy granting was the only parenting dimension for which there were no significant indirect effects but temperament (effortful control and affiliation) did seem to predict it directly, and there was only one indirect effect in which affiliation was related to acceptance-involvement through changes in

antisocial behavior. In terms of support for indirect effects between temperament and parenting through antisocial behavior, it seems that the majority of the effects were for the behavioral control aspects of parenting (particularly, knowledge, limit setting, and tracking) as opposed to the parent-adolescent relationship aspects of parenting (psychological autonomy granting and acceptance-involvement).

Several findings were consistent across the alternative models using adolescent and mother ratings of parenting. In Study 1, there was a positive indirect effect between effortful control and parental knowledge through a reduction in antisocial behavior, as predicted. Study 2 found that affiliation was negatively indirectly related to knowledge and tracking through an increase in antisocial behavior (not as predicted). And even though frustration did not directly predict parenting in Study 3, it had significant indirect effects on knowledge and tracking through increases in adolescent antisocial behavior, as predicted. Specifically, frustration was positively related to antisocial behavior which was negatively related to knowledge, tracking, and limit setting. Thus, these findings suggest that one way in which adolescent temperament relates to changes in parenting is via temperamental pathways to antisocial behavior, and subsequent links between antisocial behavior and parenting, especially behavioral control aspects of parenting. Again, they underscore the importance of examining bidirectional relations between parenting and adolescent temperament and antisocial behavior. Because evidence was found for both models, the current study shows that while parenting appears to relate to changes in antisocial behavior through adolescent temperament, adolescent temperament traits also appear to affect parenting by leading to changes in adolescent antisocial behavior.

In addition to the indirect effects, the current dissertation found that two of the three aspects of temperament that were studied related directly to changes in parenting over time, accounting even for the high stability of parenting. Effortful control in Study 1 related to increases in psychological autonomy granting, knowledge, and tracking, and to decreases in limit setting (i.e., later curfews). These findings are novel contributions to the literature concerning evocative effects of adolescent effortful control on parenting, as pointed out by Kiff, Lengua, and Zalewski (2011) who reported that the effect of effortful control on parenting has been studied in infants, toddlers, and during middle childhood, but not in preschool or adolescent samples. For example, in one such cross-sectional study, Karreman, van Tuijl, van Aken, and Deković (2008) found that effortful control in 3-year-olds predicted more positive control and less negative control in mothers and fathers. In a longitudinal study of 8- to 12-year-olds, Lengua (2006) found that effortful control negatively predicted rejection and inconsistency. Relatedly, Lengua and Kovacs (2005) found that self-regulation was related to more acceptance and less involvement over time in a small sample of 8- to 11-year-olds. This research most closely resembles the current findings and implies that mothers of adolescents who have strong effortful control abilities and are good at self-regulating, may over time reduce their involvement and provide the latitude for the adolescent to develop more autonomy and independence. Specifically, this interpretation fits with the current findings that mothers give more psychological autonomy and more behavioral freedom with respect to curfew to adolescents who are higher in effortful control abilities.

Affiliation in Study 2 related to increases in all the parenting dimensions with the exception of limit setting. These findings are also novel contributions to the literature

because, as pointed out by Kiff et al. (2011), there is also a lack of research in which positive emotionality and sociability have been studied together with parenting. In the current study, affiliation measured the adolescents' desire for emotional closeness independent of shyness and extraversion. It may be that affiliative adolescents are more likely to self-disclose to their parents thereby increasing parental knowledge over time, and in light of the overlap between temperament affiliation and personality agreeableness (Evans & Rothbart, 2007), it may be that affiliative adolescents have a more agreeable disposition, which encourages and invites increased parental tracking, psychological autonomy granting, and acceptance-involvement across adolescence. This latter possibility is consistent with theory and research on evocative gene-environment correlations (Rutter, 2006).

Frustration was the only aspect of temperament that did not have a significant direct effect on parenting over time. In previous research, frustration and irritability tend to elicit negative parenting behaviors (e.g., rejection, inconsistency, harsh parenting) (Lengua, 2006). In the current study, we used a measure of positive, authoritative parenting, instead of negative parenting, which may be one reason for the absence of direct effects of frustration on parenting. For example, Lengua (2006) found that higher irritability predicted increases in parental inconsistency, and that child irritability predicted greater inconsistent discipline whereas the effects on acceptance and involvement (i.e., positive parenting behaviors) were non-significant (Lengua & Kovacs, 2005). Similarly, in a longitudinal study of Chinese children, Lee, Zhou, Eisenberg, and Wang (2013) found that lower anger/frustration at wave 1 (ages 6-9 years) was associated with higher *authoritarian* parenting assessed at wave 2, which was 3.8 years later. They,

too, found that the longitudinal effect of anger/frustration on *authoritative* parenting was non-significant. In Study 3, even though frustration did not have significant direct effects on parenting, it was indirectly related to authoritative parenting through antisocial behavior. Thus, it seems that it is not so much the tendency to get frustrated that evokes less authoritative parenting, as it is the effect that frustration can have on aversive behavior that may evoke less authoritative parenting. By examining indirect effects, the findings of the current studies expand upon temperament theories of antisocial behavior (DeLisi & Vaughn, 2014; Nigg, 2006). For instance, without looking at the indirect effect of frustration on authoritative parenting through antisocial behavior, it would have appeared as if it had no longitudinal, evocative effect in adolescence, whereas this effect was revealed when antisocial behavior was taken into consideration.

Additionally, the indirect effects accounted for the relations between antisocial behavior and parenting. Antisocial behavior at time 2 related negatively to three of the five parenting dimensions, parental knowledge, tracking, and limit setting. These findings contribute to the growing literature which shows the importance of considering, not only how parenting influences adolescent behavior but also, how adolescent behavior influences parenting. The significant negative effect of antisocial behavior on parental knowledge is similar to a finding from a longitudinal study of 10- to 12-year-olds in which greater antisocial behavior predicted less parental knowledge later (Wertz et al., 2016). It is interesting to note here that antisocial behavior related to a reduction instead of an increase in behavioral control aspects of parenting such as tracking and limit setting. While it might be reasonable to expect parents to increase efforts to regulate the activities of a misbehaving child (by soliciting more information and requiring him or her

to come home earlier), it instead appears that parents responded to their children's antisocial behavior by giving more behavioral freedom, perhaps as a way to reduce conflict. Specifically, Laird, Pettit, Dodge, and Bates (2003) found that more antisocial behavior problems were indirectly linked to less parental knowledge through less enjoyable parent-adolescent relationships and less parental involvement. In such a case, the very aspects of parenting which would mitigate an adolescent's participation in antisocial behavior are lessened, thus allowing for more antisocial behavior. Such an interpretation is informed by coercion theory in which parents lighten or remove demands put on a misbehaving child to reduce a child's protests and complaints thus negatively reinforcing unwanted behaviors (Patterson, 1982) and is supported by relevant research concerning coercive family processes (e.g., Scaramella & Leve, 2004; Snyder, Edwards, McGraw, Kilgore, & Holton, 1994).

### **Temperament and Antisocial behavior**

Finally, in both the hypothesized and alternate models, the relations between three aspects of temperament and antisocial behavior were estimated. In the first model, the relation was concurrent at time 2, and in the second model, the relation was prospective between time 1 and 2. The findings of the current dissertation with respect to the relations between adolescent temperament and antisocial behavior largely align with previous research (e.g., demonstrating an inverse relation between effortful control and antisocial behavior) and with temperament theory or personality research in regard to temperament traits that have been studied to a lesser degree (e.g., agreeableness as the personality equivalent of affiliativeness; frustration-aggression hypothesis).

In study 1, effortful control was contemporaneously, negatively associated with antisocial behavior in the first model, and effortful control was prospectively negatively related to antisocial behavior in the second model. This finding corresponds to other research that shows a negative relation between effortful control and aggression (Ellis & Rothbart, 2001), and lower externalizing over time when effortful control increases (Lengua, 2006).

In study 3, frustration was positively related to antisocial behavior concurrently and prospectively. This finding corresponds to other research that shows adolescents' anger related positively to antisocial outcomes (Carlo, Roesch, & Melby, 1998), children's irritability related positively to adjustment problems (i.e., internalizing and externalizing) (Lengua & Kovacs, 2005), and that lower externalizing is predicted by decreases in irritability in 8- to 12-year-old children (Lengua, 2006), but extends this line of research by demonstrating that a temperamental predisposition to frustration, as opposed to negative affect including fear and anxiety, is related to antisocial behavior, including covert acts and proactive aggression in a population of adolescents.

In study 2, however, the association between affiliation and antisocial behavior was expected to be negative, insofar as affiliativeness relates to empathy and agreeableness, and based on research that suggests a negative relation with aggression. For example, Ellis and Rothbart (2001), when validating the Early Adolescent Temperament Questionnaire – Revised on a sample of 10- to 15-year-olds, found that affiliation negatively related with aggression. Yet in the current study, affiliation was found to be positively related to antisocial behavior in the first model (contemporaneously) and in the second model (longitudinally). There is little empirical

research thus far concerning affiliation and antisocial behavior, and the current finding aligns more with research concerning affiliation with antisocial peers, and deviancy training processes (Dishion et al., 1996), rather than the research concerning temperamental affiliation, which pertains to empathy and agreeableness.

In this way, findings for effortful control and frustration were more consistent with predictions, previous theory, and research than were those for affiliation. But taken together, the three studies provide strong empirical support for a temperament-based theory of antisocial behavior (DeLisi & Vaughn, 2014) and give further credence to the work that suggests there are multiple temperamental pathways to psychopathology including externalizing, conduct problems, and antisocial behavior (Nigg, 2006; Rothbart, 2011).

However, they also provide new contributions to our understanding of the relations between temperament and antisocial behavior. The current dissertation provides evidence of a longitudinal link between effortful control and antisocial behavior in an adolescent population, indicating that weak behavioral inhibition is a pathway to antisocial behavior for adolescents in addition to children. This is an important contribution to the literature because there are new temptations to resist in adolescence such as the onset of experimentation with antisocial behavior (Moffitt, 1993), and more independence from parents where adolescents are spending more time in unsupervised settings with peers (Gecas & Seff, 1990; Larson, 2001; McCuaig-Edge & Craig, 2012). For these reasons, adolescents have an increased need to self-regulate, as opposed to being externally regulated by adult supervision.



The current dissertation provides evidence that is inconsistent with Nigg's (2006) idea that low affiliation would contribute to unsocialized conduct problems, due to its relations with low empathy and psychopathy. Instead, the current findings suggest that high affiliation may be a risk factor for antisocial behavior, perhaps because it provides the motivation for association with peers, which may be harmful if those peers are antisocial and affiliation with them provides a context for deviancy training (Dishion et al., 1996).

Finally, the role of frustration has more often been studied and discussed in the case of reactive aggression, but the current findings add to somewhat sparse theory and research suggesting that frustration may play a role in proactive aggression and covert antisocial behavior as well. For example, Nigg's (2006) construal of frustration leading to psychopathology through processes of excessive approach behavior suggests that, in the case of covert or proactive forms of antisocial behavior, high frustration may lead to greater persistence in the pursuit of antisocial behavior (which can be fun and rewarding) even when this goal-directed behavior is blocked by authority figures or others. In other words, high frustration might predispose one to defiance and rebellion.

### **Implications**

The implications of the current studies are both applied and theoretical. First, the alternate analyses found support for evocative gene-environment effects, in that not only was adolescent temperament and antisocial behavior influenced by authoritative parenting, but so too was authoritative parenting influenced by adolescent temperament and antisocial behavior. This is an important pattern of findings which suggests that

future researchers should include pathways from adolescent to parent (when appropriate) in their models of antisocial behavior.

Also, parents should be aware of this pattern as their children approach adolescence. Children who are temperamentally at risk for engaging in antisocial behavior in adolescence via multiple temperamental pathways are likely to evoke negative or undesirable parenting either directly or indirectly, thus placing them at further risk via compromised parenting (Kiff et al., 2011). For example, across the three studies, there was evidence that temperamental risk factors (i.e., poor effortful control, greater frustration, and high affiliation) predicted more antisocial behavior directly, and they also predicted less acceptance-involvement, lower parental knowledge, less tracking, lenience around curfews, and lower psychological autonomy granting in mothers over time, either directly or indirectly through increases in antisocial behavior. That being said, even though the current findings indicate evocative effects on many aspects of authoritative parenting, neither low effortful control nor high frustration were related to decreases in acceptance-involvement, and consequently, this leaves open the possibility of encouraging adolescent self-disclosure to gain parental knowledge, even with kids with temperamental risk factors. Indeed, previous literature such as Fletcher, Steinberg, and Williams-Wheeler (2004) and Soenens, Vansteenkiste, Luyckx, and Goossens (2006) shows that positive aspects of the parent-child relationship encourage adolescent self-disclosure, which in turn is related to more knowledge and less antisocial behavior.

One family I know with two teenagers plans a yearly dinner at a local restaurant to discuss plans as a family and as individuals for the year (e.g., what vacation do they want to take together, what extracurricular activities do they want to participate in, what

goals do they have). These types of conversations open the lines of communication and help the children know their voices are heard and that their opinions matter in their family. It is also a way for parents to model effortful control by showing how they deliberate over their own short-term and long-term goals, and encourages their adolescent children to take time to think about their own future.

On the basis of the findings that adolescent effortful control is related positively to psychological autonomy granting, knowledge, and tracking over time, parents of youth with poor effortful control abilities may find that they are tempted to become more psychologically controlling (of the adolescent who does not seem to manage or regulate their own emotions and behaviors), to avoid difficult conversations or overreact to self-disclosures from their child, or to ask fewer questions about the things that are important to their child. Thus, parenting interventions may benefit from the inclusion of procedures of acceptance and commitment therapy (ACT) to promote psychological flexibility (Hayes, Luoma, Bond, Masuda, & Lillis, 2006) that would help parents to resist evocative gene-environment effects that come from living with children with difficult temperaments and behaviors. This type of approach has been used with parents of children with autism and learning disabilities, but it can also play a role in promoting positive parenting and reducing externalizing problems (Brassell et al., 2016). Practically speaking, to help reduce the risk associated with this temperament risk (poor effortful control), parents may encourage their adolescent child to participate in family discussions and planning (listening to and validating their opinions which may differ from their own), make themselves available emotionally and physically to hear from their adolescent child

about the events of their day, and ask appropriate questions about how they like to spend their time and with whom.

Parents of children who are high in frustration proneness may find it more challenging to respond to their children with patience and understanding. The easily frustrated adolescent who engages in antisocial behavior may be given more behavioral autonomy if parents find it too difficult to enforce limits, or don't want to cross their child. Indeed, discipline does seem to be inconsistent in response to child irritability (Lengua & Kovacs, 2005). Also, highly frustrated adolescents may make less enjoyable company, and either through their parents' or their own withdrawal in the home and greater engagement in antisocial behavior, there may be less opportunity for parents to solicit information from their children, and for children to voluntarily disclose information to their parents (Laird et al., 2003). Parents of adolescents who are high in frustration proneness should be made aware of the link between frustration and antisocial behavior, and the link between antisocial behavior and reduced behavioral control in parents. Instead, parents are encouraged to lovingly and assertively double their behavioral control efforts, rather than remove them, because removing them is negatively reinforcing for both parents and adolescents and will likely lead to more antisocial behavior in the future. For this reason, parenting interventions that involve elements of the ACT approach would help with evocative effects of frustration too (Hayes et al., 2006). In this approach, parents are taught to accept certain negative thoughts and feelings they may have toward their child, and cognitive defusion techniques are used to alter the undesirable function (but not form or frequency) of those thoughts (Hayes, Pistorello, & Biglan, 2008). Parents are then encouraged to commit to effective action

linked to chosen values (Hayes, Pistorello, & Biglan, 2008). In this way, parents are able to maintain the role of a loving authority figure in their child's adolescent years.

Adolescent affiliation was shown to have positive direct effects on parenting, but also to have negative indirect effects on parenting through a positive relation with antisocial behavior. Affiliation appears to be an aspect of temperament that does not always function in a straightforward way. For instance, affiliative adolescents desire emotional closeness with others and in some cases, this leads to improved relations with parents (or to more psychological autonomy granting, acceptance-involvement, knowledge, and tracking), but in other cases, it leads to greater involvement in antisocial behavior and subsequently poorer parenting (less acceptance-involvement, knowledge, tracking, and limit setting). Adolescents in general begin spending more time with peers than with parents (Gecas & Seff, 1990). Furthermore, if an affiliative adolescent directs his or her desire for relational connectedness to peers instead of parents, he is likely to spend more time outside the home with peers, and his or her values and behaviors may begin to resemble those of his or her peers, largely borne out of a desire to impress peers and fit in during adolescence (Monahan, Steinberg, & Cauffman, 2009). Moreover, the effects of affiliation are likely to depend on the characteristics of the friends with whom the adolescent wishes to affiliate. Because antisocial friendships are a context for deviancy training (Dishion et al., 1996), and adolescents who are high in antisocial behavior are more likely to form such friendships (Poulin & Boivin, 2000), gaining knowledge about an adolescent's friends and activities may be key for parents of highly affiliative adolescents.

There is also evidence to suggest that while low affiliativeness tends to be linked to externalizing symptoms, high affiliativeness may be linked to internalizing symptoms like depression and anxiety (Ellis & Rothbart, 2001; Rothbart, 2007). Knowing this, parents of highly affiliative adolescents should seek to offer their child focused face-to-face time each day, and continue to set reasonable limits around curfew, and ask questions about their child's friendships and activities. This may help affiliative adolescents find fulfillment in their relationships at home, and, even if they still spend a greater amount of time outside the home with peers, avoid a common pitfall associated with seeking approval from friends at any cost. Indeed, Soenens, Vansteenkiste, and Niemiec (2009) found that autonomy supportive parenting (as opposed to controlling parenting) reduces affiliation with deviant peers, by promoting greater adolescent acceptance and internalization of parental values. In having internalized parental beliefs and prohibitions, adolescents would be more likely to self-regulate and avoid being influenced by peers to engage in antisocial behaviors that they know to be wrong. This may be another way to offset any risk of deviant peer affiliation for parents of children who are highly affiliative.

Second, some aspects of parenting that are generally conceived as benign can be perceived by adolescents negatively. This has implications for research in that it is important to account for possible differences between parent and adolescent perspectives of parenting, as was done in the current dissertation. But it also has implications for parenting, such that what might be believed to be a positive aspect of parenting needs to be considered in light of the adolescents' temperament and personality, and the overall relationship between the parent and adolescent. For example, psychological autonomy

granting related negatively to effortful control over time when controlling for the stability of effortful control. Self-determination theory would suggest that giving psychological autonomy or treating children in an autonomy supportive way should lead to positive outcomes (Ryan & Deci, 2000) such as improved effortful control. Similarly, acceptance-involvement according to mother-reported parenting in the first study related positively to antisocial behavior, and it related positively to antisocial behavior through its positive relation with affiliation in the second study. Generally, acceptance-involvement, the degree to which the adolescent perceives his or her parent as being warm and responsive, is found to confer good outcomes on the child such as psychosocial development and academic competence (Gray & Steinberg, 1999), but the current dissertation suggests that mothers' perceptions of their own acceptance-involvement may reflect something more along the lines of overinvolvement or intrusiveness. Or at least, it may be perceived as such by certain adolescents. Indeed, the third study found a positive relation between adolescent-rated acceptance-involvement and adolescent frustration, which subsequently related to more antisocial behavior. Thus, it may be helpful for parents to seek to understand how their parenting is being perceived by and influencing their individual child, and for researchers to acknowledge that associations between variables may differ as a function of informant.

Next, these findings have implications for treatment approaches for adolescents who engage in antisocial behavior, in that understanding how antisocial behaviors develop can be helpful in creating intervention efforts to help youth desist from them (Human-Hendricks & Roman, 2014). Two main approaches to treatment are cognitive-behavioral training for the adolescent (plus interpersonal relationship or social-skills

building) and behavioral management training for the parent to improve familial relations. In the view of Tolan and Loeber (1993), it is best to combine individual and parent training for the greatest impact.

But while cognitive behavioral training (Armeliu & Andreassen, 2007), parent management training (DeGarmo, Patterson, & Forgatch, 2004), problem-solving skills training, residential and forensic services, and multidimensional treatment foster care (Curtis, Ronan, Heiblum, Reid, & Harris, 2002) have shown some positive effects in improving effective parenting and reducing child behavior problems, Curtis et al. (2002) acknowledged their limited effectiveness to reduce antisocial behavior in the long term. Multisystemic therapy, however, is discussed as an approach that recognizes the “combination of difficulties within multiple systems in the individual’s ecology” and that achieves “long term positive outcomes with antisocial youth” (p.55). Recently, Bouchard and Smith (2017) have drawn from social-ecological systems theory to suggest the need for research and interventions concerning bullying to involve an examination of the mesosystem, that is, the interaction between teacher-student relationships and the bullying experiences of children with their peers. Some interventions focus only on individual microsystems, without seeking to understand how they may link and come into contact with each other (e.g., families and schools, families and peers).

The Fast Track program is a multisystemic treatment to prevent antisocial behavior in the United States. The program was examined in a large sample ( $N = 891$ ) of early-starting children, and parent behavior-management, child social cognitive skills, reading, home visiting, mentoring, and classroom curricula were part of the 10-year intervention (Conduct Problems Prevention Research Group, 2011). Comparisons



between the control condition and the intervention condition found that the program prevented the development of conduct disorder, oppositional defiant disorder, attention deficit hyperactivity disorder, and any externalizing disorder among those at highest initial risk, “suggesting that targeted intervention can prevent externalizing disorders to promote the raising of healthy children” (p.331). However, such an intervention can be costly in terms of the amount of time invested and the monetary value associated with such a program.

Despite the promise and ubiquity of these approaches, it has been lamented that “the success rate of treatment with antisocial behavior is quite low” (Tolan and Loeber, 1993, p.320) which, in light of the current findings, may be due to whether traditional intervention approaches need to be tailored to the individual child, to take individual differences in temperament into consideration. It is worthwhile to ask whether these different traditional approaches to preventing or treating antisocial behavior work equally well for adolescents who struggle with frustration/anger, versus having problems with effortful control of impulses, or those who are particularly driven to associate with deviant peers because of being highly affiliative? For example, problem-solving skills training approaches in cognitive behavioral therapy may be less likely to work for adolescents with low effortful control, who may not reflect on consequences before acting. Similarly, anger control programs (e.g., Lochman’s Anger Coping program) may be best suited for adolescents who are temperamentally prone to frustration and anger (Lochman, 1992). Furthermore, it is likely that, programs involving group therapy will not be helpful for adolescents who are susceptible to deviancy training by antisocial peers because of their tendency toward high affiliation. As noted by Frick (2001), previous

intervention attempts which involved antisocial peer groups had iatrogenic effects, in that the level and severity of antisocial behavior exhibited by the treated youths actually increased as opposed to decreased. For example, Dishion, McCord, and Poulin (1999) found that peer-group interventions inadvertently reinforced problem behaviors and negative life outcomes in adulthood. Adolescents who are highly affiliative may be more prone to these effects, reducing the intended effectiveness of the treatment program.

Essentially, the current findings suggest that because of multiple temperamental pathways to antisocial behavior, treatment programs that acknowledge individual differences in temperament and pathways to antisocial behavior are preferred. Frick (2001) aptly wrote that interventions for youth with conduct disorder need to be both comprehensive and individualized. As well, treatments that did not account for the psychosocial factors involved in the etiology of the disorder (e.g., peers, family, neighborhood) are limited in their effectiveness to produce lasting change, especially in those children who are at risk because of individual predispositions. Findings from the current studies provide support for treatments that address dual risks conferred by adolescent temperament as well as those that come by way of non-authoritative parenting responses to adolescent temperament.

In summary, the current dissertation has many implications for research, treatment approaches, and parenting. Some parents may find it helpful to talk with other friends about their experiences, join a support program for parents at a community centre or public library, or borrow some books and articles to read about raising adolescent children. While some involvement in antisocial behavior is common in adolescence and may be expected, parents who observe more severe or frequent involvement, or who

recognize some persevering temperamental risks in their children associated with antisocial behavior, may be wise to seek out the counsel of a mental health professional.

### **Strengths and Contributions**

This dissertation addressed several gaps in the vast literature concerning antisocial behavior. First, the current dissertation studied a broader range of parenting variables, which included several relational components (psychological autonomy granting, acceptance-involvement) as well as multiple behavioral or regulative components (limit setting, tracking) of parenting. Furthermore, the actual or perceived knowledge of mothers was differentiated from their attempts to gain knowledge through parental solicitation or tracking. Additionally, in light of current research showing that parental knowledge is most strongly predicted by adolescent self-disclosure (Kerr, Stattin, & Burk, 2010), the adolescent report of parental knowledge included items assessing their own self-disclosure. This broader view of parenting enabled the current dissertation to evaluate how varied yet related dimensions of parenting relate differentially to antisocial behavior through the various aspects of temperament. Furthermore, because they were included in the same model, so that paths were estimated simultaneously, the relative importance (i.e., effect sizes) of the parenting dimensions could be compared to each other. For example, of the parenting dimensions studied, adolescent-reported limit setting seemed to have the greatest negative effect on antisocial behavior over time, followed by parental knowledge, which, according to mother-reported parenting, had the greatest negative effect on antisocial behavior over time.

As referenced in the previous section, not only did the current dissertation integrate multiple factors that contribute to the development of antisocial behavior, by

examining a broad range of authoritative parenting constructs and aspects of temperament that have been minimally studied, but it also benefited from the inclusion of multiple informants, mothers and their adolescent children. Correlation analyses and *t*-tests comparing the means of parenting and temperament variables according to mother and adolescent reports revealed that on average mothers provided more favorable reports of their own parenting and more favorable reports of their child's temperament than did adolescents. However, the scores were significantly correlated. Temperament measures and behavior measures are often completed by parents and teachers of children. But there is reason to think that adolescent behavior may be more strongly related to adolescent perceptions about their parents, or their own temperaments, than potentially more objective measures of these constructs (Abar, Jackson, & Wood, 2014). In the current dissertation, in Study 3, acceptance-involvement according to adolescents', but not mothers', reports related to more frustration over time and thus more antisocial behavior. It may suggest that adolescents perceive highly accepting and involved mothers to be overly involved, but at the very least it shows that there are differences between mother and adolescent perspectives of parenting, making it worthwhile to consider them separately.

The second gap that this dissertation sought to fill was the relative paucity of research on the role of temperament in the development of adolescent antisocial behavior compared to the greater number of studies on the role of temperament in behavior problems among children. DeLisi and Vaughn (2014) reported the widespread significance of self-regulation and negative emotionality in predicting criminal behaviors and involvement with the criminal justice system across the lifespan, not only in

childhood. And while there is a large base of research connecting effortful control with antisocial behavior, there is considerably less research regarding frustration and affiliation with antisocial behavior, although there is some (e.g., Veenstra, Lindenburg, Oldehinkel, De Winter, & Ormel, 2006). Thus, frustration and affiliation were the temperament traits assessed in the second and third studies. Furthermore, despite extensive previous research on effortful control, the current study used a longitudinal design that accounted for the high stability of effortful control when many other previous studies, at least those involving adolescents, have not (e.g., Finkenauer, Engels, & Baumeister, 2005; Trentacosta & Shaw, 2009). In other words, the current analyses allowed the unique effects of parenting on effortful control, affiliation, and frustration to be estimated, above and beyond the effects of prior levels of these temperament traits. It should be mentioned as well that because of this design, the unique effects of parenting on antisocial behavior were estimated, because the stability of antisocial behavior was taken into account statistically.

Another very important contribution of this dissertation is that the possibility of reciprocal relations between parenting and antisocial behavior were examined in an alternate set of analyses which modeled an indirect relation between temperament and parenting through antisocial behavior. For many years, the predominant theme in the antisocial behavior literature has been that parenting contributes to adolescent behavior, for example, through a lack of parental monitoring or knowledge (e.g., Tompsett & Toro, 2010; Vieno, Nation, Pastore, & Santinello, 2009), or because of harsh and inconsistent parenting practices. However, it is becoming increasingly better understood that parents are influenced by their children and that children's behavior is not solely the outcome of

poor parenting, as evidenced by the methods of more recent studies which examine bidirectional effects (e.g., Burke, Pardini, & Loeber, 2008; Shaffer, Lindhiem, Kolko, & Trentacosta, 2013). In light of this, it is notable that the main analyses of the current studies showed that adolescent temperament had direct effects on antisocial behavior, and the alternate analyses showed that temperament, through antisocial behavior, prospectively related to authoritative parenting while accounting for the high stability of parenting.

Finally, in terms of adolescents reporting their own antisocial behavior, there is research to suggest that adolescents are reliable sources of information regarding their own antisocial behavior. Verhulst and van der Ende (1992) conducted a study to assess agreement between parents' reports and adolescents' self-reports of problem behavior according to the Child Behavior Checklist. They found that correlations ranged from 0.27 to 0.56, adolescents reported many more problems than their parents did, discrepancies were larger for externalizing than for internalizing problems, for girls than for boys, and the discrepancies increased with age. The findings indicated that adolescents, especially as they grow older, are indispensable informants on their own problem behaviors. The current study included adolescent report of their own antisocial behavior because parental knowledge is a potential limiting factor on the accuracy of mother-reported antisocial behavior.

### **Directions for Future Research**

While the current studies examined the longitudinal relations of parenting with temperament and antisocial behavior, and between temperament with antisocial behavior and parenting, the longitudinal effects of antisocial behavior on parenting were not

examined. In line with research that suggests coercive cycles between parenting and adolescent behavior, future research should examine the unique effects of antisocial behavior on parenting above and beyond the stability effects of parenting in a longitudinal design. Laird et al. (2003) have begun to answer this question using this type of design.

Additionally, an extension of the current studies would be to examine a possible indirect link between adolescent temperament and antisocial behavior over time through parenting, given that there was evidence of temperamental pathways to antisocial behavior and given that adolescent temperament (at least effortful control and affiliation) was found to change parenting.

The current dissertation examined three temperament traits in three separate studies, however, future research could examine the effects of multiple temperament traits on antisocial behavior at the same time (in the same path model) to determine the unique and independent effects of one from the others. For example, when Lengua and Kovacs (2005) used this approach, they found that irritability demonstrated unique effects above the other aspects of temperament in predicting internalizing and externalizing behaviors.

Surgency, another aspect of temperament, which includes low fear and low shyness, was not examined in the current dissertation, although it has been studied in terms of callous-unemotional traits (low fear, low empathy; Nigg, 2006). Future research could explore this temperament trait as a possible intervening variable in the link between parenting and antisocial behavior in adolescence. Surgency could be examined as a possible moderator of authoritative parenting dimensions that are likely to inhibit the

association between surgency and antisocial behavior over time, such as limit setting and knowledge.

Indeed, not only does temperament have main effects on antisocial behavior, but there is also a growing body of research to suggest that there is an interactive relation between parenting and temperament in predicting antisocial behavior. For example, Stice and Gonzales (1998) found that parenting is more strongly related to antisocial behavior and substance use at greater levels of temperamental risk (i.e., behavioral undercontrol and negative affectivity). As noted by Rothbart and Rueda (2005), temperament both “influences and is influenced by the experience of the individual” (p.2). Nigg (2006) and Van Lier, Wanner, and Vitaro (2007) posited that the individual-level characteristics that place a child at risk for antisocial behavior (e.g., temperament) are exacerbated by environmental-level characteristics such as poor parenting styles and affiliation with antisocial peers. Several studies have shown that temperament is a moderator of other variables such as authoritative parenting which can be a gatekeeper of the effects of friends’ antisocial behavior on adolescents’ involvement in antisocial behavior. Future research should examine this possibility in adolescence using a longitudinal design.

Although it was not studied in the current dissertation, there is another important category of external influences on adolescent behavior, namely peer involvement in antisocial behavior. Indeed, according to Kuhn and Laird (2013), low self-control, in and of itself does not uniformly influence individuals’ antisocial behavior. Instead, they theorized that limited opportunities to engage in antisocial behavior attenuate the link between self-control and antisocial behavior (e.g., parents may restrict, while peers may provide opportunities). In their words, “opportunity restrictions attenuated the association



between low self-control and antisocial behavior such that low self-control was less strongly associated with antisocial behavior when youth experienced less antisocial peer involvement, less unsupervised time, more parental solicitation, and more family rules than when youth experienced more antisocial peer involvement, more unsupervised time, less parental solicitation, and fewer family rules” (p.813).

Also, in a sample of 726 child twins, Burt and Klump (2013) found that the effects of shared environmental influences (and not genetic influences) on childhood delinquency was moderated by delinquent peer affiliation, so that the relation was stronger for children who had more delinquent peer affiliation than for those children who had less delinquent peer affiliation. Importantly, their work highlighted that there are complex interactions between parent and peer processes. Given the finding in the current dissertation of a positive relation between affiliation and antisocial behavior, it would be particularly useful to integrate peer influences into future studies. These are some of the possible considerations for future research in the field of adolescent antisocial behavior.

### **Final Thoughts and Conclusion**

When considering the origin of antisocial behavior or other disruptive behaviors in general, there are two prevailing philosophical views: the “original sin” belief states that since Adam, we are all born with an innate propensity to evil. And in contrast, Jean Jacques Rousseau purported that we are born innocent and we are corrupted by our experiences (Tremblay, 2010). In some ways, the current dissertation provides support for elements of both views. While there were findings of multiple temperamental pathways to antisocial behavior indicative of innate, biological predispositions, there were also findings indicative of the sometimes-disadvantageous parental behaviors which

contribute to an increase in antisocial behavior. At the same time, adolescent temperament was shown to have positive influences on parenting, and positive parenting was shown to have advantageous influences on adolescent temperament and behavior.

I think in my own eight years as a mother, I have had the opportunity to see firsthand how my children have been born each with their own unique temperaments, with respect to effortful control, their desire for emotional closeness and connectedness, and their threshold for irritation and frustration. I can see how at times my own personality and parenting behaviors evoke responses from them, good or otherwise. While I desire for them to walk a path of integrity and moral uprightness both in my presence and my absence, there has always been forgiveness and love offered for times when their choices lead them elsewhere. I find it helpful to reflect on the kind authority figures I have had in my life, including my parents, who showed me patience and understanding throughout my years of growing up, as I hope to train my children toward a life filled with goodness and love toward their neighbour.

## References

- Abar, C.C., Jackson, K.M., & Wood, M. (2014). Reciprocal relations between perceived parental knowledge and adolescent substance use and delinquency: The moderating role of parent-teen relationship quality. *Developmental Psychology*, 50(9), 2176-2187.
- Adams, K. (2003). Effectiveness of juvenile curfews at crime prevention. *The Annals of the American Academy*, 587(1), 136-159.
- Armeliuss, B.Â., Andreassen, T.H. (2007). Cognitive-behavioral treatment for antisocial behavior in youth in residential treatment. *Cochrane Database of Systematic Reviews*, 4, doi: 10.1002/14651858.CD005650.pub2.
- Barber, B.K., Olsen, J.E., & Shagle, S.C. (1994). Associations between parental psychological and behavioral control and youth internalized and externalized behaviors. *Child Development*, 65(4), 1120-1136.
- Barnes, G.M., & Farrell, M.P. (1992). Parental support and control as predictors of adolescent drinking, delinquency, and related problem behaviors. *Journal of Marriage and the Family*, 54, 763-776.
- Blos, P. (1967). The second individuation process of adolescence. *Psychoanalytic Study of the Child*, 22, 162-186.
- Bouchard, K.L., & Smith, J.D. (2017). Teacher-student relationship quality and children's bullying experiences with peers: Reflecting on the mesosystem. *The Educational Forum*, 81, 108-125.
- Brassell, A.A., Rosenberg, E., Parent, J., Rough, J.N., Fondacaro, K., & Seehuus, M. (2016). Parents' psychological flexibility: Associations with parenting and child psychosocial well-being. *Journal of Contextual Behavioral Science*, 5(2), 111-120.
- Brown, B.B., Mounts, N., Lamborn, S.D., & Steinberg, L. (1993). Parenting practices and peer group affiliation in adolescence. *Child Development*, 64(2), 467-482.
- Burke, J.D., Pardini, D.A., Loeber, R. (2008). Reciprocal relationships between parenting behavior and disruptive psychopathology from childhood through adolescence. *Journal of Abnormal Child Psychology*, 36, 679-692.
- Burt, S.A., Barnes, A.R., McGue, M., & Iacono, W.G. (2008). Parental divorce and adolescent delinquency: Ruling out the impact of common genes. *Developmental Psychology*, 44(6), 1668-1677.
- Burt, S.A., & Klump, K.L. (2013). Delinquent peer affiliation as an etiological moderator of childhood delinquency. *Psychological Medicine*, 43(6), 1269-1278.

- Carlo, G., Roesch, S.C., & Melby, J. (1998). The multiplicative relations of parenting and temperament to prosocial and antisocial behaviors in adolescence. *Journal of Early Adolescence, 18*, 148-170.
- Conduct Problems Prevention Research Group. (2011). The effects of the fast track preventive intervention on the development of conduct disorder across childhood. *Child Development, 82*(1), 331-345.
- Crocetti, E., Van der Graaff, J., Moscatelli, S., Keijsers, L., Koot, H.M., Rubini, M., Meeus, W., & Branje, S. (2016). A longitudinal study on the effects of parental monitoring on adolescent antisocial behaviors: The moderating role of adolescent empathy. *Frontiers in Psychology, 7*(1726), 1-11.
- Curtis, N.M., Ronan, K.R., Heiblum, N., Reid, M., & Harris, J. (2002). Antisocial behaviors in New Zealand youth: Prevalence, interventions and promising new directions. *New Zealand Journal of Psychology, 31*(2), 53-58.
- DeGarmo, D. S., Patterson, G. R., & Forgatch, M. S. (2004). How do outcomes in a specified parent training intervention maintain or wane over time? *Prevention Science, 5*, 73-89.
- Delhaye, M., Kempenaers, C., Burton, J., Linkowski, P., Stroobants, R., & Goossens, L. (2012). Attachment, parenting, and separation-individuation in adolescence: A comparison of hospitalized adolescents, institutionalized delinquents, and controls. *The Journal of Genetic Psychology, 173*(2), 119-141.
- DeLisi, M. & Vaughn, M.G. (2014). Foundation for a temperament-based theory of antisocial behavior and criminal justice system involvement. *Journal of Criminal Justice, 42*, 10-25.
- Dishion, T. J., McCord, J., & Poulin, F. (1999). When interventions harm: Peer groups and problem behavior. *American Psychologist, 54*(9), 755-764.
- Dishion, T.J., Spracklen, K.M., Andrews, D.W., & Patterson, G.R. (1996). Deviancy training in male adolescent friendships. *Behavior Therapy, 27*, 373-390.
- Ellis, L. K., & Rothbart, M. K. (2001, April). *Revision of the Early Adolescent Temperament Questionnaire*. Poster presented at the biennial meeting of the Society for Research in Child Development, Minneapolis, MN.
- Evans, D.E., & Rothbart, M.K. (2007). Developing a model for adult temperament. *Journal of Research in Personality, 41*, 868-888.
- Farrington, D.P. (2000). Psychosocial predictors of adult antisocial personality and adult convictions. *Behavioral Sciences and the Law, 18*, 605-622.

- Finkenauer, C., Engels, R., & Baumeister, R. (2005). Parenting behavior and adolescent behavioral and emotional problems: The role of self-control. *International Journal of Behavioral Development*, 29(1), 58-69.
- Fletcher, A. C., Darling, N., & Steinberg, L. (1995). Parental monitoring and peer influences on adolescent substance use. In J. McCord (Ed.), *Coercion and punishment in long-term perspectives* (pp. 259 – 271). Cambridge, MA: Cambridge University Press.
- Fletcher, A. C., Steinberg, L., & Williams-Wheeler, M. (2004). Parental influences on adolescent problem behavior: Revisiting Stattin and Kerr. *Child Development*, 75, 781–796.
- Frick, P.J. (2001). Effective interventions for children and adolescents with conduct disorder. *The Canadian Journal of Psychiatry*, 46(7), 597-608.
- Gecas, V., & Seff, M.A. (1990). Families and adolescents: A review of the 1980s. *Journal of Marriage and the Family*, 52, 941-958.
- Gius, M.P. (2011). The effects of curfews on juvenile criminal activity: An individual-level analysis. *Applied Economics Letters*, 18, 311-313.
- Gray, M.R., & Steinberg, L. (1999). Unpacking authoritative parenting: Reassessing a multidimensional construct. *Journal of Marriage and Family*, 61(3), 574-587.
- Grossman, E.R., & Miller, N.A. (2015). A systematic review of the impact of juvenile curfew laws on public health and justice outcomes. *American Journal of Preventive Medicine*, 49(6), 945-951.
- Hawkins, J.D., & Weis, J.G. (1985). The social development model: An integrated approach to delinquency prevention. *Journal of Primary Prevention*, 6(2), 73-97.
- Hayes, S.C., Luoma, J.B., Bond, F.W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes, and outcomes. *Psychology Faculty Publications*. Paper 101.
- Hayes, S.C., Pistorello, J., & Biglan, A. (2008). Acceptance and commitment therapy: model, data, and extension to the prevention of suicide. *Brazilian Journal of Behavioral and Cognitive Therapy*, 10(1), 81-102.
- Hoeve, M., Dubas, J.S., Eichelsheim, V.I., van der Laan, P.H., Smeenk, W., & Gerris, J.R. (2009). The relationship between parenting and delinquency: A meta-analysis. *Journal of Abnormal Child Psychology*, 37, 749-775.

- Houltberg, B.J., Morris, A.S., Cui, L., Henry, C.S., & Criss, M.M. (2016). The role of youth anger in explaining links between parenting and early adolescent prosocial and antisocial behavior. *Journal of Early Adolescence*, 36(3), 297-318.
- Human-Hendricks, A.R. & Roman, N.V. (2014). What is the link between antisocial behavior of adolescents and parenting: A systematic review of parental practices to manage antisocial behavior.
- Janssen, H.J., Deković, M., & Bruinsma, G.J.N. (2014). Parenting and time adolescents spend in criminogenic settings: A between- and within-person analysis. *The British Journal of Criminology*, 54(4), 551-567.
- Janssen, H.J., Weerman, F.M., & Eichelsheim, V.I. (2017). Parenting as a protective factor against criminogenic settings? Interaction effects between three aspects of parenting and unstructured socializing in disordered areas. *Journal of Research in Crime and Delinquency*, 54(2), 181-207.
- Karreman, A., van Tuijl, C., van Aken, M.A.G., Deković, M. (2008). The relation between parental personality and observed parenting: The moderating role of preschoolers' effortful control. *Personality and Individual Differences*, 44(3), 723-734.
- Keijsers, L., Frijns, T., Branje, S.J.T., & Meeus, W. (2009). Developmental links of adolescent disclosure, parental solicitation, and control with delinquency: moderation by parental support. *Developmental Psychology*, 45(5), 1314-1327.
- Kerr, M., & Stattin, H. (2000). What parents know, how they know it, and several forms of adolescent adjustment: Further support for a reinterpretation of monitoring. *Developmental Psychology*, 36(3), 366-380.
- Kerr, M., Stattin, H., & Burk, W.J. (2010). A reinterpretation of parental monitoring in longitudinal perspective. *Journal of Research on Adolescence*, 20(1), 39-64.
- Kerr, M., Stattin, H., & Trost, K. (1999). To know you is to trust you: parents' trust is rooted in child's disclosure of information. *Journal of Adolescence*, 22, 737-752.
- Kerr, M., Stattin, H., & Özdemir, M. (2012). Perceived parenting style and adolescent adjustment: Revisiting directions of effects and the role of parental knowledge. *Developmental Psychology*, 48, 1540-1553.
- Kiff, C.J., Lengua, L.J., & Zalewski, M. (2011). Nature and nurturing: Parenting in the context of child temperament. *Clinical Child and Family Psychology Review*, 14(3), 251-301.

- Kochanska, G. (2002). Mutually responsive orientation between mothers and their young children: A context for the early development of conscience. *Psychological Science*, 11(6), 191-195.
- Kochanska, G. & Kim, S. (2014). A complex interplay among the parent-child relationship, effortful control, and internalized, rule-compatible conduct in young children: Evidence from two studies. *Developmental Psychology*, 50(1), 8-21.
- Kuhn, E.S., & Laird, R.D. (2013). Parent and peer restrictions of opportunities attenuate the link between low self-control and antisocial behavior. *Social Development*, 22(4), 813-830.
- Laird, R.D., Pettit, G.S., Dodge, K.A., & Bates, J.E. (2003). Change in parents' monitoring knowledge: Links with parenting, relationship quality, adolescent beliefs, and antisocial behavior. *Social Development*, 12(3), 401-419.
- Larson, R.W. (2001). How U.S. children and adolescents spend time: What it does (and doesn't) tell us about their development. *Current Directions in Psychological Science*, 10(5), 160-164.
- Lee, E.H., Zhou, Q., Eisenberg, N., & Wang, Y. (2013). Bidirectional relations between temperament and parenting styles in Chinese children. *International Journal of Behavioral Development*, 37(1), 57-67.
- Lengua, L.J. (2006). Growth in temperament and parenting as predictors of adjustment during children's transition to adolescence. *Developmental Psychology*, 42(2), 819-832.
- Lengua, L.J. & Kovacs, E.A. (2005). Bidirectional associations between temperament and parenting and the prediction of adjustment problems in middle childhood. *Applied Developmental Psychology*, 26, 21-38.
- Lochman, J. E. (1992). Cognitive-behavioral intervention with aggressive boys: three year follow-up and preventive effects. *Journal of Consulting and Clinical Psychology*, 60, 426-432.
- Loeber, R. & Dishion, T. (1983). Early predictors of male delinquency: A review. *Psychological Bulletin*, 94(1), 68-99.
- Loeber, R., & Stouthamer-Loeber, M. (1987). Prediction. In H.C. Quay (Ed.), *Handbook of Juvenile Delinquency* (pp.325-382). New York: John Wiley and Sons.
- Luyckx, K., Tildesley, E.A., Soenens, B., Andrews, J.A., Hampson, S.E., Peterson, M., & Duriez, B. (2011). Parenting and trajectories of children's maladaptive behaviors: A 12-year prospective community study. *Journal of Clinical Child & Adolescent Psychology*, 40(3), 468-478.

- McCuaig-Edge, H. & Craig, W. (2012). Peers. In J.G. Freeman (Ed.), *The health of Canada's young people: A mental health focus* (pp. 67-84). Retrieved from <http://www.phac-aspc.gc.ca/hp-ps/dca-dea/publications/hbsc-mental-mentale/assets/pdf/hbsc-mental-mentale-eng.pdf>
- Moffitt, T.E. (1993). Adolescence-limited and life-course persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, 100, 674–701.
- Monahan, K.C., Steinberg, L., & Cauffman, E. (2009). Affiliation with antisocial peers, susceptibility to peer influence, and antisocial behavior during the transition to adulthood. *Developmental Psychology*, 45(6), 1520-1530.
- Moroney, E., Tung, I., Brammer, W.A., Peris, T.S., & Lee, S.S. (2017). Externalizing outcomes of youth with and without ADHD: Time-varying prediction by parental ADHD and mediated effects. *Journal of Abnormal Child Psychology*, 45(3), 457-470.
- Morris, A., Silk, J., Steinberg, L., Sessa, F., Avenevoli, S., & Essex, M. (2002). Temperamental vulnerability and negative parenting as interacting predictors of child adjustment. *Journal of Marriage and Family*, 64(2), 461-471. Retrieved from <http://www.jstor.org/stable/3600118>
- Nigg, J.T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 47(3/4), 395-422.
- Patterson, G.R. (1982). *Coercive family process*. Eugene, OR: Castalia Publishing Company.
- Patterson, G.R., & Dishion, T. (1985). Contributions of families and peers to delinquency. *Criminology*, 23(1), 63-79.
- Poulin, F. & Boivin, M. (2000). The role of proactive and reactive aggression in the formation and development of boys' friendships. *Developmental Psychology*, 36(2), 233-240.
- Rothbart, M.K. (2007). Temperament, development, and personality. *Current Directions in Psychological Science*, 16(4), 207-212. doi: 10.1111/j.1467-8721.2007.00505.x
- Rothbart, M.K. (2011). *Becoming who we are: Temperament, personality and development*. New York: Guilford Press.
- Rothbart, M.K., Ahadi, S.A., & Hershey, K.L. (1994). Temperament and social behavior in childhood. *Merrill-Palmer Quarterly*, 40, 21-39.



- Rothbart M.K. & Bates J.E. (2006). Temperament. In Damon W., Lerner R., Eisenberg N. (Eds.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (6th ed., pp. 99–166). New York: Wiley.
- Rothbart, M. K., & Rueda, M. R. (2005). The development of effortful control. In U. Mayr, E. Awh, & S. Keele (Eds.), *Developing individuality in the human brain: A tribute to Michael I. Posner* (167-188). Washington, DC: American Psychological Association.
- Rutter, M. (2006). *Genes and behavior: Nature–nurture interplay explained*. Oxford, UK: Blackwell Scientific.
- Ryan, R.M. & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78.
- Scaramella, L.V., & Leve, L.D. (2004). Clarifying parent-child reciprocities during early childhood: The early childhood coercion model. *Clinical Child and Family Psychology Review*, 7(2), 89-107.
- Segrin, C., Woszidlo, A., Givertz, M., Bauer, A., & Murphy, M.T. (2012). The association between overparenting, parent-child communication, and entitlement and adaptive traits in adult children. *Family Relations*, 61(2), 237-252.
- Schofield, T.J., Conger, R.D., Donnellan, M.B., Jochem, R., Widaman, K.F., & Conger, K.J. (2008). Parent personality and positive parenting as predictors of positive adolescent personality development over time. *Merrill-Palmer Quarterly (Wayne State University Press)*, 58(2), 255-283.
- Shaffer, A., Lindhiem, O., Kolko, D.J., & Trentacosta, C.J. (2013). Bidirectional effects between parenting practices and child externalizing behavior: A cross-lagged panel analysis in the context of a psychosocial treatment and 3-year follow-up. *Journal of Abnormal Child Psychology*, 41(2), 199-210.
- Silkenbeumer, J., Schiller, E-M., Holodynski, M., & Kärtner, J. (2016). The role of co-regulation for the development of social-emotional competence. *Journal of Self-Regulation and Regulation*, 2, 17-31.
- Skinner, E.A., & Zimmer-Gembeck, M.J. (2007). The development of coping. *Annual Review of Psychology*, 58, 119-144.
- Snyder, J., Edwards, P., McGraw, K., Kilgore, K., & Holton, A. (1994). Escalation and reinforcement in mother-child conflict: Social processes associated with the development of physical aggression. *Development and Psychopathology*, 6(2), 305-321.

- Soenens, B., Vansteenkiste, M., Luyckx, K., & Goossens, L. (2006). Parenting and adolescent problem behavior: An integrated model with adolescent self-disclosure and perceived parental knowledge as intervening variables. *Developmental Psychology*, 42(2), 305-318.
- Soenens, B., Vansteenkiste, M., & Niemiec, C.P. (2009). Should parental prohibition of adolescents' peer relationships be prohibited? *Personal Relationships*, 16, 507-530.
- Sorge, G.B., Skilling, T.A., & Toplak, M.E. (2015). Intelligence, executive functions, and decision making as predictors of antisocial behavior in an adolescent sample of justice-involved youth and a community comparison group. *Journal of Behavioral Decision Making*, 28, 477-490.
- Stattin, H. & Kerr, M. (2000). Parental monitoring: a reinterpretation. *Child Development*, 71(4), 1072-1085.
- Steinberg, L., Darling, N., & Fletcher, A. C. (1995). Authoritative parenting and adolescent adjustment: An ecological journey. In P. Moen, G. H. Elder, Jr., & K. Luscher (Eds.), *Examining lives in context: Perspectives on the ecology of human development* (pp. 423-466). Washington, DC: American Psychological Association.
- Stice, E. & Gonzales, N. (1998). Adolescent temperament moderates the relation of parenting to antisocial behavior and substance use. *Journal of Adolescent Research*, 13(1), 5-31.
- Tolan, P.H., Loeber, R. (1993). Antisocial Behavior. In P.H. Tolan & B.J. Cohler (Eds.), *Handbook of Clinical Research & Practice with Adolescents* (pp 307-331). New York: Wiley & Sons.
- Tompsett, C.J., & Toro, P.A. (2010). Predicting overt and covert antisocial behaviors: Parents, peers, and homelessness. *Journal of Community Psychology*, 38(4), 469-485.
- Tremblay, R.E. (2010). Developmental origins of disruptive behavior problems: The 'original sin' hypothesis, epigenetics and their consequences for prevention. *Journal of Child Psychology and Psychiatry*, 51(4), 341-367.
- Trentacosta, C.J., & Shaw, D.S. (2009). Emotional self-regulation, peer rejection, and antisocial behavior: Developmental associations from early childhood to early adolescence. *Journal of Applied Developmental Psychology*, 30(3), 356-365.
- Tu, Y-K., Gunnell, D., & Gilthorpe, M.S. (2008). Simpson's paradox, Lord's Paradox, and suppression effects are the same phenomenon – the reversal paradox. *Emerging Themes in Epidemiology*, 5(2).

- Van Doorn, M.D., Branje, S.J.T., & Meeus, W.H.J. (2008). Conflict resolution in parent-adolescent relationships and adolescent delinquency. *The Journal of Early Adolescence*, 28(4), 503-527.
- Van Lier, P.A.C., Wanner, B., & Vitaro, F. (2007). Onset of antisocial behavior, affiliation with deviant friends, and childhood maladjustment: A test of the childhood- and adolescent-onset models. *Development and Psychopathology*, 19, 167-185.
- Van Petegem, S., Soenens, B., Vansteenkiste, M., & Beyers, W. (2015). Rebels with a cause? Adolescent defiance considered from the perspective of reactance theory and self-determination theory. *Child Development*, 86(3), 903-918.
- Veenstra, R., Lindenburg, S., Oldehinkel, A.J., De Winter, A.F., & Ormel, J. (2006). Temperament, environment, and antisocial behavior in a population sample of preadolescent boys and girls. *International Journal of Behavioral Development*, 30, 422-432.
- Verhulst, F.C., & van der Ende, J., (1992). Agreement between parents' reports and adolescents' self-reports of problem behavior. *Journal of Child Psychology and Psychiatry*, 33(6), 1011-1023.
- Vieno, A., Nation, M., Pastore, M., & Santinello, M. (2009). Parenting and antisocial behavior: A model of the relationship between adolescent self-disclosure, parental closeness, parental control, and adolescent antisocial behavior. *Developmental Psychology*, 45(6), 1509-1519. doi: 10.1037/a0016929.
- Warr, M. (2002). *Companions in crime: The social aspects of criminal conduct*. New York: Cambridge University Press.
- Wei, C., & Kendall, P.C. (2014). Parental involvement: Contribution to childhood anxiety and its treatment. *Clinical Child and Family Psychology Review*, 17(4), 319-339.
- Wertz, J., Nottingham, K., Agnew-Blais, J., Matthews, T., Pariante, C.M., Moffitt, T.E., & Arseneault, L. (2016). Parental monitoring and knowledge: Testing bidirectional associations with youths' antisocial behavior. *Development and Psychopathology*, 28(3), 623-638.

## Appendix A

### **Factor Analyses of Antisocial Behavior**

To address the issue of how to analyze antisocial behavior, I assessed whether the current data set justified a distinction between overt-covert antisocial behaviors or the violence, vandalism, and theft subscales using exploratory factor analysis. Table 5.3 shows the factor loadings for a 1-, 2-, and 3-factor solution. Even though some of the factor loadings for the single factor solution were small, the factors of antisocial behavior were not clearly differentiated along either an overt-covert dimension, nor according to the theft, vandalism, and violence subscales. For example, in the 2-factor solution, some items from the violence subscale loaded onto the covert factor, as well as or instead of loading on the overt factor. In the 3-factor solution, there was not a clean demarcation between what were meant to be violence, vandalism, and theft items. It could be the case that some covert acts (e.g., damaging one's property) are related to overt acts (e.g., physical violence) in that they share a common thread of aggressiveness. Indeed, Frick et al. (1993) agreed with the overt-covert dimension but also suggested a "destructive-non-destructive" dimension after a meta-analytic review of factor analyses and cross-validation in a clinical sample. Another distinction can be made based on parental and peer correlates of the behavior. For example, Hewitt and Jenkins (1946) classified youth who have experienced parental rejection and are engaged in vandalism and violence as committing "unsocialized aggressive behavior" and they classified youth who have experienced parental negligence and exposure to delinquency patterns and are engaged in theft as committing "socialized delinquency" (p.2). For these reasons, it was decided to analyze antisocial behavior as a single outcome variable in the current dissertation.

Table 5.3

*Factor loadings based on a principal components analysis with oblimin rotation for 19 items of the Self-Reported Delinquency Questionnaire (SRDQ) (N = 521)*

	<u>1 Factor</u>	<u>2 Factors</u>		<u>3 Factors</u>		
	AB	Overt	Covert	Theft	Van	Viol
Broken or destroyed something not yours (Vandalism)	.69	.63		.49	.59	
Taken and kept something from store without paying (Theft)	.65	.72		.71		
Taken and kept something between \$10 and \$100 (Theft)	.62	.77		.71	.20	
Fight between groups of youth (Violence)	.56	.28	.43	.35		.49
Had a fist fight with anyone (Violence)	.55		.63		.26	.62
Taken money from your house (Theft)	.55	.55		.50	.25	
Bought or sold something that was stolen (Theft)	.53	.72		.76		
Threatened to hit someone or force them to do something (Violence)	.53	.30	.37	.23	.49	.24
Taken and kept something worth less than \$10 (Theft)	.50	.62		.53	.27	
Gone without paying to a place you should have paid (Theft)	.50	.25	.38	.38		.55
Entered a place you were not allowed (Theft)	.49	.30	.31	.36		.39
Thrown rocks, bottles, or objects at someone (Violence)	.48		.53		.58	.32
Taken school property worth \$10 or more (Theft)	.45	.44		.45		
Broken or destroyed something of your parents or family (Vandalism)	.44	.42		.24	.64	
Hit someone who had not done anything (Violence)	.43		.41		.67	
Carried a weapon (Violence)	.41		.69		.23	.63
Broken or destroyed school equipment (Vandalism)	.34	.32		.28	.20	
Used a weapon in a fight (Violence)	.21		.36			.36
Started a fire in a store or elsewhere (Vandalism)	.18		.46			.50

*Note.* AB = antisocial behavior; Viol = violence, Van = vandalism; for the 2-factor and 3-factor solutions, factor loadings less than .20 are not reported

## Appendix B

### **Fearfulness and Antisocial Behavior**

Fearfulness is the degree to which one experiences worry and distress, and it is often observed as behavioral inhibition or withdrawal when an individual is presented with stimuli that are construed as threatening or dangerous (Rothbart, 2007). When individuals are low in fearfulness of punishment situations or concerning the negative consequences of one's misbehavior, forms of punishment such as yelling and threatening are less effective (Pardini, Lochman, & Frick, 2003) in reducing misbehavior.

Frick and Morris (2004) reviewed research that showed links between low levels of fearfulness and higher levels of conduct problems. They suggested that the pathway to conduct problems among adolescents with low fear is more likely through an underdeveloped conscience (due to a low capacity for guilt-related empathy) than through difficulty with emotion regulation. It is useful to note here that researchers such as Kochanska and Rothbart have found relations between effortful control, conscience and empathy, and behavior problems (e.g., Kochanska & Knaack, 2003; Rothbart, Ahadi, & Hershey, 1994). In addition, individuals who are low in fearful inhibition may experience low levels of arousal as an aversive state. For such individuals, engaging in antisocial behaviors that are covert like vandalism and theft may serve the purpose of providing a "thrill" to regulate unpleasant emotions.

However, for those who are moderately to extremely fearful, fearfulness may be conceived as an emotional inhibitor of antisocial behavior, in that fear regarding the possible negative outcomes for the perpetrator (and the victim, if applicable) is sufficient to cause abstention from antisocial behavior.

## Appendix C

### **Affiliation Items**

#### *EATQ-R – Affiliation (Adolescent report)*

1. I want to be able to share my private thoughts with someone else
2. I enjoy hugging people who I like
3. I will do most anything to help someone I care about
4. It is important to me to have close relationships with other people
5. I am quite a warm and friendly person

#### *EATQ-R - Affiliation (Mother report)*

1. Likes taking care of people
2. Likes to be able to share his/her private thoughts with someone else
3. Would like to be able to spend time with a good friend every day
4. Enjoys exchanging hugs with people he/she likes
5. Wants to have close relationships with other people
6. Is quite a warm and friendly person

## Appendix D

### *Demographic Information*

1. How old are you? \_\_\_\_\_ years old
2. Are you male or female?    ☐ Male                      ☐ Female
3. What grade are you in? Grade: \_\_\_\_\_
4. Who do you live with the most?  

<input type="checkbox"/> With my mother and my father	<input type="checkbox"/> With my father and his partner
<input type="checkbox"/> With a foster family	<input type="checkbox"/> With my mother and her partner
<input type="checkbox"/> With my father only	<input type="checkbox"/> With my mother and my stepfather
<input type="checkbox"/> With my mother only	<input type="checkbox"/> With my father and my stepmother
<input type="checkbox"/> No one	<input type="checkbox"/> Other: _____
5. How many brothers and sisters do you have? (include half-brothers and half-sisters) \_\_\_\_\_ Brothers    \_\_\_\_\_ Sisters



## Appendix E

### *Authoritative Parenting Measure*

Think about your mother/stepmother (or female guardian) who you live with the most and answer these questions.

1. I can count on her to help me out.
2. She tells me that I shouldn't argue with adults.
3. She keeps pushing me to do my best in whatever I do.
4. She tells me that I should give in on arguments rather than make people angry.
5. She keeps pushing me to think for myself.
6. When I get a poor grade in school, she makes my life miserable.
7. She helps me with my schoolwork if there is something I don't understand.
8. She tells me that her ideas are correct and that I should not question them.
9. When she wants me to do something, she explains why.
10. Whenever I argue with her, she says things like, you'll know better when you grow up.
11. When I get a poor grade in school, she encourages me to try harder.
12. She lets me make my own plans for things I want to do.
13. She knows who my friends are.
14. She acts cold and unfriendly if I do something she does not like.
15. She spends time just talking with me.
16. When I get a poor grade in school, she makes me feel guilty.
17. We do fun things together.
18. She won't let me do things with her when I do something she does not like.
19. How much does your mother/stepmother (or female guardian) ask you about...
  - a) where you go at night?
  - b) what you do with your free time?
  - c) where you are most afternoons after school?
20. How much does your mother/stepmother (or female guardian) really know...
  - a) where you go at night?
  - b) what you do with your free time?
  - c) where you are most afternoons after school?
21. In a typical week, what is the latest you can stay out on school nights (Sunday-Thursday)?

<input type="radio"/> I'm not allowed out	<input type="radio"/> 9:00 pm to 9:59 pm	<input type="radio"/> 11:00 pm or later
<input type="radio"/> Before 8:00 pm	<input type="radio"/> 10:00 pm to 10:59 pm	<input type="radio"/> As late as I want
<input type="radio"/> 8:00 pm to 8:59 pm		
22. In a typical week, what is the latest you can stay out on a Friday or Saturday night?

<input type="radio"/> I'm not allowed out	<input type="radio"/> 9:00 pm to 9:59 pm	<input type="radio"/> 11:00 pm or later
<input type="radio"/> Before 8:00 pm	<input type="radio"/> 10:00 pm to 10:59 pm	<input type="radio"/> As late as I want
<input type="radio"/> 8:00 pm to 8:59 pm		

*Note.* Psychological autonomy granting items were all even-numbered items excluding items 20 and 22 and were all reverse-scored except for item 12. Acceptance-involvement items were all odd-numbered items excluding items 19 and 21. Tracking items were items 19 a, b, and c. Knowledge items were items 20 a, b, and c. Limit setting items were items 21 and 22.

## Appendix F

### *Early Adolescent Temperament Questionnaire – Revised*

How “true” is each statement for you?

1. It is easy for me to really concentrate on homework problems.
2. When someone tells me to stop doing something it is easy for me to stop.
3. I do something fun for a while before starting my homework, even when I’m not supposed to.
5. It bothers me when I try to make a phone call and the line is busy.
6. The more I try to stop myself from doing something I shouldn’t, the more likely I am to do it.
8. If I have a hard assignment to do, I get started right away.
10. I find it hard to shift gears when I go from one class to another at school.
12. I get very upset if I want to do something and my parent(s) won’t let me.
13. When trying to study, I have difficulty tuning out background noise and concentrating.
14. I finish my homework before the due date.
16. I am good at keeping track of several different things that are happening around me.
18. It’s easy for me to keep a secret.
20. I get irritated when I have to stop doing something that I am enjoying.
22. I put off working on projects until right before they’re due.
25. It really annoys me to wait in long lines.
27. I pay close attention when someone tells me how to do something.
28. I get very frustrated when I make a mistake in my school work.
29. I tend to get in the middle of one thing, then go off and do something else.
30. It frustrates me if people interrupt me when I’m talking.
31. I can stick with my plans and goals.
32. I get upset if I’m not able to do a task really well.

*Note.* The effortful control subscale was comprised of items 1, 2, 3, 6, 7, 8, 10, 13, 14, 16, 18, 22, 27, 29, and 31. Items 3, 6, 10, 13, 22, and 29 were reverse-coded. The frustration subscale was comprised of items 5, 12, 20, 25, 28, 30, and 32. Items from the fearfulness and surgency subscales are removed from this list, and the items from the affiliation subscale are in Appendix C.

## Appendix G

### ***Early Adolescent Temperament Questionnaire-Revised Parent Report***

#### Effortful Control Items:

1. Has a hard time finishing things on time.
2. If having a problem with someone, usually tries to deal with it right away.
3. Has a hard time waiting his/her turn to speak when excited.
4. Opens presents before he/she is supposed to.
5. Usually does something fun for a while before starting his/her homework, even though he/she is not supposed to.
6. Finds it easy to really concentrate on a problem.
7. When asked to do something, does it right away, even if he/she doesn't want to.
8. When interrupted or distracted, forgets what he/she is about to say.
9. Is more likely to do something he/she shouldn't do the more he/she tries to stop himself/herself.
10. Has a difficult time tuning out background noise and concentrating when trying to study.
11. Usually finishes his/her homework before it's due.
12. Usually gets started right away on difficult assignments.
13. Is good at keeping track of several different things that are happening around him/her.
14. Usually puts off working on a project until it's due.
15. Is able to stop himself/herself from laughing at inappropriate times.
16. Is often in the middle of doing one thing and then goes off to do something else without finishing it.
17. Is usually able to stick with his/her plans and goals.
18. Pays close attention when someone tells him/her how to do something.

Note: Items 1, 3, 4, 5, 8, 9, 10, 14, and 16 were reverse coded.

#### Frustration Items:

1. Is annoyed by little things other kids do.
2. Gets very irritated when someone criticizes him/her.
3. Gets irritated when I will not take him/her places when he/she wants to go.
4. Gets irritated when he/she has to stop doing something he/she is enjoying.
5. Hates it when people don't agree with him/her.
6. Gets very frustrated when he/she makes a mistake in his/her school work.

## Appendix H

### *Self-Reported Delinquency Questionnaire*

In the past year, how often have you done the following?

1. Purposely broken or destroyed musical instruments, sports equipment or other school equipment?
2. Taken and kept any school property worth \$10 or more?
3. Taken and kept something from a store without paying?
4. Threatened to hit someone or to force them to do something they didn't want to do?
5. Taken part in fights between groups of youth (gangs)?
6. Purposely broken or destroyed something that didn't belong to you?
7. Taken and kept something worth less than \$10, that didn't belong to you?
8. Bought or sold something you knew was stolen?
9. Entered a place where you were not allowed?
10. Taken and kept something worth between \$10 and \$100 that didn't belong to you?
11. Gone without paying to a place where you should have paid? (movie theatre, concert, sports event?)
12. Used a weapon (stick, knife, gun, rocks) in fighting with someone else?
13. Purposely broken or destroyed something belonging to your parents or another family member?
14. Taken money from the house without permission, or without the intent of saying anything?
15. Carried a weapon (chain, knife, gun, etc.)?
16. Started a fire in a store or elsewhere?
17. Thrown rocks, bottles or other objects at someone?
18. Hit someone who hadn't done anything?
19. Had a fist fight with anyone?

*Note.* The vandalism subscale consisted of items 1, 6, 13, and 16. The theft subscale consisted of items 2, 3, 7, 8, 9, 10, 11, and 14. The violence subscale consisted of items 4, 5, 12, 15, 17, 18, and 19.

## Appendix I

### *Ethics Approval*

Deborah Van Oosten, 07:36 .../2003 -0400, REB 02-286, Dane et al. - Accepted as clarified Page 1 of 3

X-Sender: dvanooost@spartan.ac.brocku.ca  
X-Mailer: QUALCOMM Windows Eudora Version 5.2.0.9  
Date: Mon, 28 Apr 2003 07:36:43 -0400  
To: adane@brocku.ca, jeffrey.derevensky@mcgill.ca, jmcphree@brocku.ca,  
lroot@nadas.on.ca  
From: Deborah Van Oosten <deborah.vanoosten@brocku.ca>  
Subject: REB 02-286, Dane et al. - Accepted as clarified  
Cc: engemann@ed.BrockU.CA, mowen@spartan.ac.brocku.ca  
X-Spam-Status: No, hits=0.9 required=8.0  
tests=AWL,EXTRA\_MPART\_TYPE,MIME\_LONG\_LINE\_QP,SPAM\_PHRASE\_02\_03,  
WEB\_BUGS  
version=2.43-brock-1.01

Senate Research Ethics Board

Extensions 3943/3035, Room AS 302

DATE: April 28, 2003

FROM: Joe Engemann, Chair  
Senate Research Ethics Board (REB)

TO: Andrew Dane, Psychology  
Jeffrey Derevensky, McGill University  
Jennifer McPhee, Community Health Sciences  
Lisa Root, Problem Gambling Program

FILE: 02-286, Dane/Derevensky/McPhee/Root

TITLE: Parental Socialization of Youth Gambling

**DECISION:** Accepted as clarified.

This project has been approved for the period of **April 28, 2003 to January 30, 2004** subject to full REB ratification at the Research Ethics Board's next scheduled meeting. The approval may be extended upon request. *The study may now proceed.*

Please note that the Research Ethics Board (REB) requires that you adhere to the protocol as last reviewed and approved by the REB. The Board must approve any modifications before they can be implemented. If you wish to modify your research project, please refer to [www.BrockU.CA/researchservices/forms.html](http://www.BrockU.CA/researchservices/forms.html) to complete the appropriate form **REB-03 (2001) Request for Clearance of a Revision or Modification to an Ongoing Application**.

Adverse or unexpected events must be reported to the REB as soon as possible with an indication of how these events affect, in the view of the Principal Investigator, the safety of the participants and the continuation of the protocol.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research protocols.

The Tri-Council Policy Statement requires that ongoing research be monitored. A Final Report is required for all projects, with the exception of undergraduate projects, upon completion of the project. Researchers with projects lasting more than one year are required to submit a Continuing Review Report annually. The Office of Research Services will contact you when this form **REB-02 (2001) Continuing Review/Final Report** is required.

Please quote your REB file number on all future correspondence.